

IMF Framework and Analytical Tool for the Monitoring of CBRs

**R. Brian Langrin,
Resident Advisor in Financial Stability and Crisis
Prevention, IMF (CARTAC)**

**April 16-20, 2018
Bank of Guyana**

Outline

- Key Concepts
- Background
 - Drivers of CBR withdrawals
 - MCM's CBR monitoring framework
- Minimum and expanded scope frameworks
- Minimum and expanded scope template
- SWIFT message types
- IMF Analytical Toolkit
- Use of IMF dummy SWIFT data set
- Examples of analytical output using dummy SWIFT data
- Additional analysis

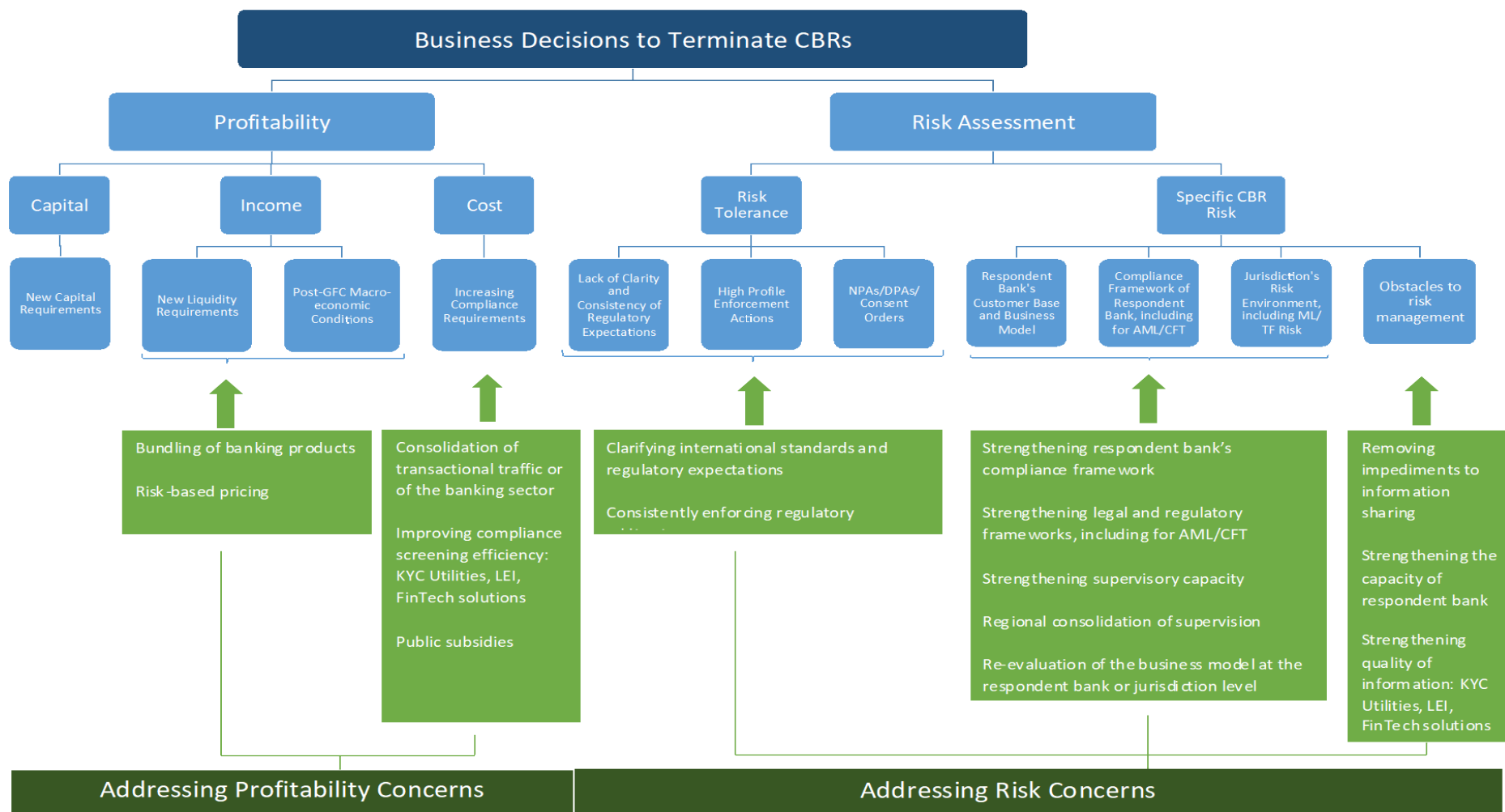
Correspondent Banking: Definitions

- **Correspondent Banking:** The provision of a current account (called a nostro account) by a bank to another bank, which uses this nostro account to facilitate cross-border payments and trade finance transactions of its customers (e.g. individuals, legal entities, or other banks).
- The bank providing the nostro account is called the **correspondent bank**, and the bank using the nostro account is called the **respondent bank**.
- The relationship between the correspondent and respondent bank is called a **Correspondent Banking Relationship (CBR)**.
- If a correspondent bank maintains one or more CBRs with respondent banks in the country it is called an **Active Correspondent (AC)** for that country.

Correspondent Banking: Definitions (2)


- A **direct CBR** is a relationship that offers nostro accounts in the currency of the country in which the correspondent bank is domiciled
- A **nested CBR** is a relationship that offers nostro accounts in a currency different from the country in which the correspondent bank is domiciled
- However, relationships with G-SIBs are classified as **Global CBRs**
 - Distinction between nesting and direct less relevant for Global correspondent banks

Drivers of CBR withdrawals



Background - MCM's CBR monitoring framework

- CBR withdrawals have been monitored using ad hoc surveys and SWIFT data aggregated at the country level
- Several IMF member countries requested TA on developing a monitoring framework to more systematically gather information on de-risking and conduct analytical work on identifying the drivers and impact
- MCM's CBR monitoring framework was published in October 2017 in response to calls for a diagnostic tool for identifying
 - the evolution of drivers and impact of de-risking using granular SWIFT data at both bank and country levels
 - unusual flows or patterns and for discussions with the banks on strategies and policies for maintaining CBRs



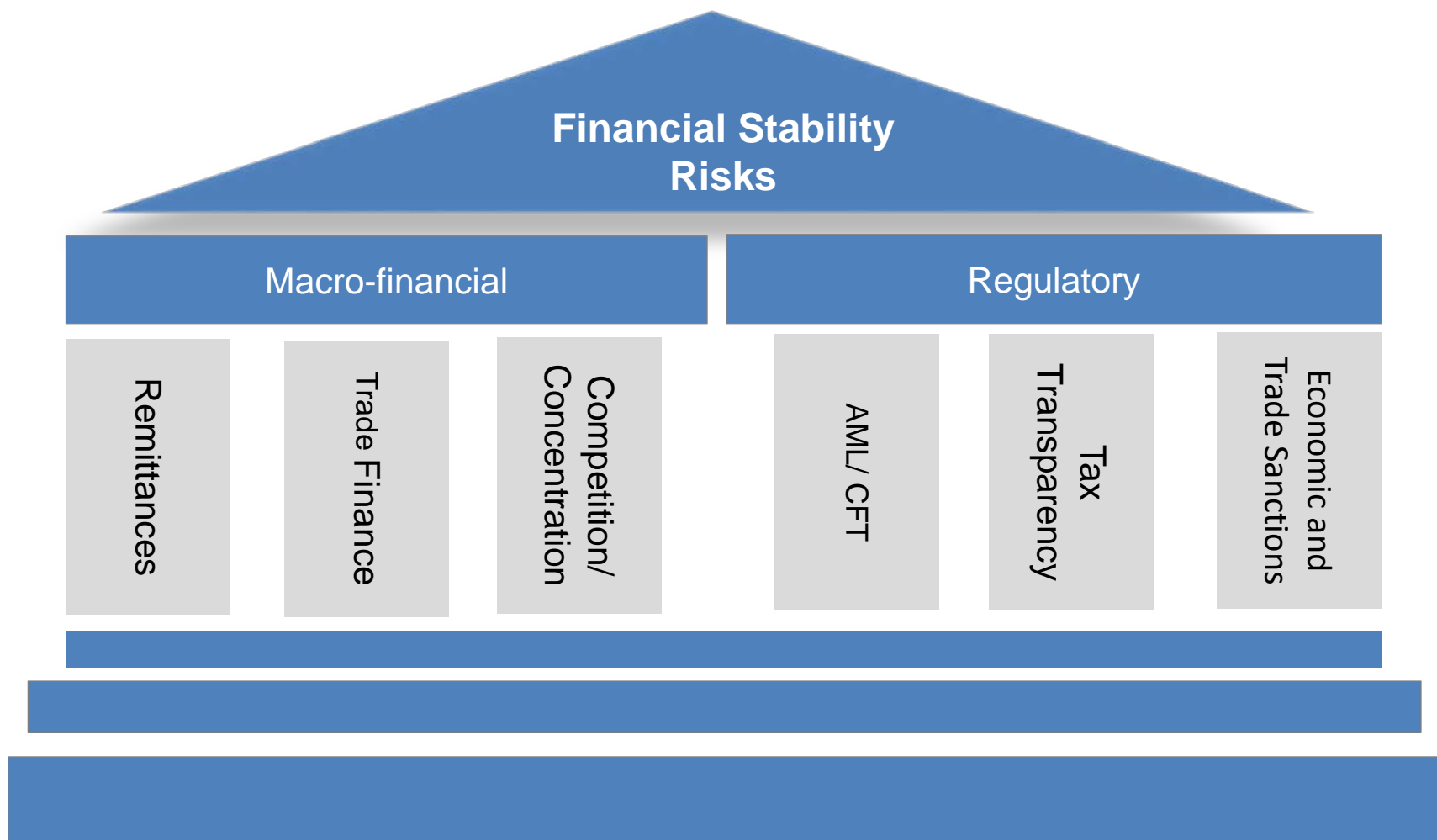
WP/17/216

IMF Working Paper

Understanding Correspondent Banking Trends:
A Monitoring Framework

By Dirk Jan Grolleman and David Jutra

MCM's CBR monitoring framework



MCM's CBR monitoring framework (2)

Minimum Scope

- Data
 - **Aggregate** accounting (core banking system) data per reporting period
- Other features
 - **Simple to use:** Excel-based
 - **Limited analysis:** qualitative fields on the range of services and possible restrictions imposed by the correspondent bank for policy analysis

Expanded Scope

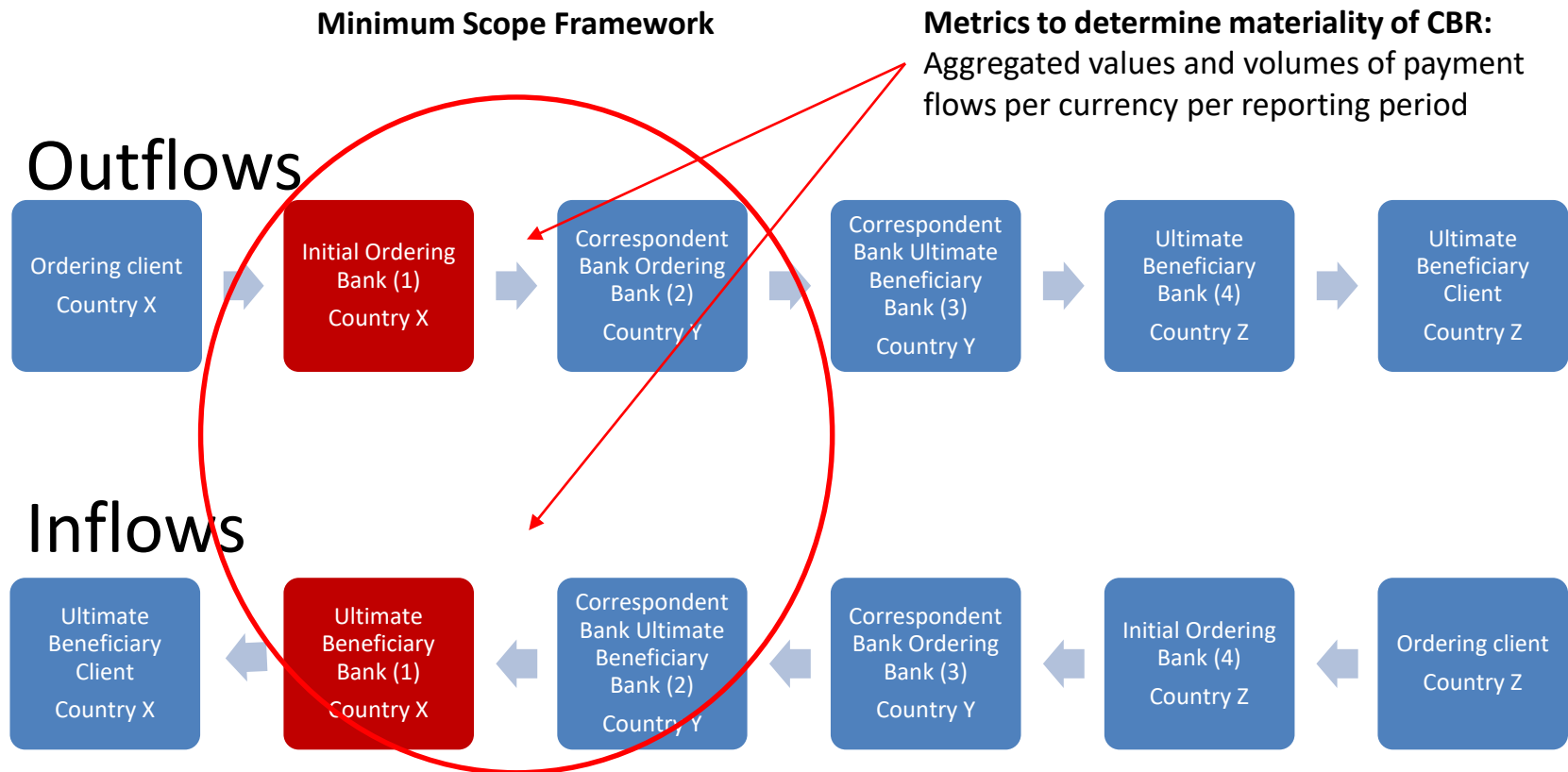
- Data
 - SWIFT **granular** transaction data
- Other features
 - **Steep learning curve:** R software
 - **Deep and wide-ranging analysis:** integrates SWIFT data, network analysis tools and indices (e.g. remittances, sanctions, transparency) for policy analysis

MCM's CBR monitoring framework (3)

Basic metrics for monitoring:

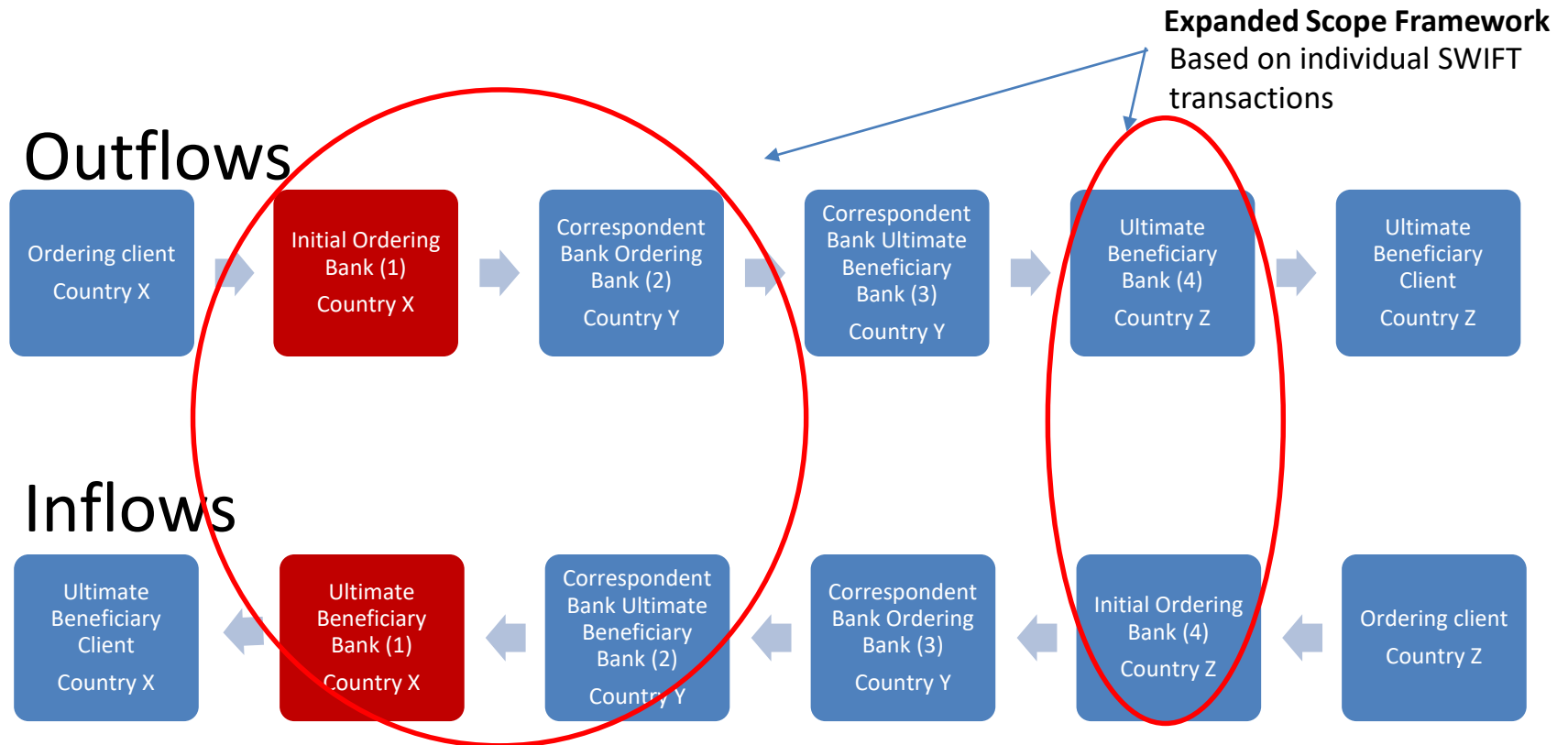
- Number and identity of ACs
- Number and identity of CBRs per respondent bank
- Nature of ACs/CBRs: Global / Direct / Nested
- Number of nostro accounts per CBR
- Currencies in which the accounts are operated (currency corridors)
- Value of transactions processed per nostro account
- Volumes (number of transactions) per nostro account
- Limitations in third payments services
- Restrictions on clients and/or transactions
- (Additional Services and products – credit lines, deposit accounts etc.)

Minimum scope framework



The red blocks denote the reporting/supervised bank

Expanded scope framework



The red blocks denote the reporting/supervised bank

MCM's CBR monitoring template

- minimum scope

ANNEX I.A: MINIMUM SCOPE TEMPLATE

Column A	B	C	D	E	F	G	H
Period <input type="text"/>	Account number <input type="text"/>	BIC8 <input type="text"/>	BIC8 name <input type="text"/>	BIC8 country <input type="text"/>	Counterparty BIC8 <input type="text"/>	Counterparty BIC8 name <input type="text"/>	Counterparty BIC8 Country <input type="text"/>
Reporting period (e.g. 2017_Q1)	Product administration number / account number	BIC8 reporting bank	Name reporting bank	ISO two letter country code reporting bank	BIC8 correspondent bank	Name correspondent bank	ISO two letter country code

Corresponds with columns E-J of the Expanded Scope Template (Annex I.B)

I	J	K	L	M	N	O	P
Currency	Amount Sent	Amount Received	USD Amount Sent	USD Amount Received	Transactions sent	Transactions received	Balance
ISO three letter currency code / currency in which the account is denominated	In original currency	In original currency	In USD	In USD	Number of transactions	Number of transactions	Per end reporting period

Corresponds with columns O-U of the Expanded Scope Template (Annex I.B)

Q	R	S	T	U
Limit	Account description	Restrictions	Type of Restrictions	Explanation (max 30 characters incl. spaces)
Per end reporting period	Drop-down list*	Drop-down list*	Drop-down list*	

MCM's CBR monitoring template

- minimum scope (2)

Drop-down list: Account description (column R):

1. Nostro account - Full Service
2. Nostro account - Full Service excl. cash handling services
3. Nostro account - Full Service excl. check clearing
4. Nostro account - Full Service excl. cash handling and check clearing services
5. Nostro account - Trade Finance /Documentary Credit only
6. Nostro account - Limited services
7. Bank-to-bank account
8. Deposit account
9. Credit line
10. Guarantee line
11. Other

Drop-down list: Restrictions (column S):

1. No restrictions
2. Moderate restrictions
3. Significant restrictions
4. Not relevant
5. Unknown

Drop-down list: Type of Restrictions (column T):

1. Not relevant
2. Formal restriction on certain client segments
3. Informal restriction on certain client segments
4. Formal and informal restrictions
5. Other

MCM's CBR monitoring template

- expanded scope

ANNEX LB: EXPANDED SCOPE TEMPLATE

Column A	B	C	D	E	F	G	H
Period	Initial Ordering BIC ¹	Initial Ordering BIC ² name	Initial Ordering Country	BIC ³	BIC ⁴ name	BIC ⁵ Country	Counterparty BIC ⁶
Month and year of the transaction (e.g. Mar-17)	BIC ³ Code	Name ordering institution	ISO two letter country code	BIC ³ Code reporting institution	Name reporting institution	ISO two letter country code reporting institution	BIC ³ correspondent bank

I	J	K	L	M	N	O	P
Counterparty BIC ⁶ name	Counterparty BIC ⁵ Country	End Beneficiary BIC ³	End Beneficiary BIC ⁴ name	End Beneficiary Country	Message Type	Currency	Amount
Name correspondent bank	ISO two letter country code correspondent bank	BIC ³ beneficiary Bank	Name beneficiary bank	ISO two letter country code	MT103, 202 or 700	ISO three letter currency code	Transaction amount in original currency

Q	R
USD Amount	# Transactions
Transaction amount in USD	Number of transactions

MCM's CBR monitoring template

- expanded scope (3)

Box 1. Network Analysis: Selection Menu in Program Code

Line 110 of the code: <code>pathway_length_toggle <- "f"</code>	# Can be r for "correspondent relationships" e for "endpoint" (ordering and end beneficiary) or f for "full"
Line 111 of the code: <code>system_or_individual_view <- "s"</code>	# Can be s for "system" or b for "bank"
Line 112 of the code: <code>country_or_institution_view <- "c"</code>	# Can be c for "country" or i for "institution"
Line 113 of the code: <code>color_using_index <- "yes"</code>	# Can be "yes" or "no". Requires an additional file if "yes".
Line 114 of the code: <code>selected_bank <- "XXXYYYZZ"</code>	# Needs to be a BIC 8-letter code
Line 115 of the code: <code>selected_country <- "XU"</code>	# Needs to be an ISO 2-letter code for the country of the respondent bank(s) under analysis
Line 116 of the code: <code>selected_period <- "6"</code>	# Selects the period (1-6) for which the map will be generated
Line 117 of the code: <code>currency <- "USD"</code>	# Needs to be a 3-letter currency ticker, use "All" if not specifying a single currency

SWIFT message types

- SWIFT is the universal standard for cross-border payments using message types (MT) to support the business transactions of users.
- An MT is composed of three digits, which generally define its category, group, and type.
- Only information on MT103, MT202 and MT700 messages are included in data collection.

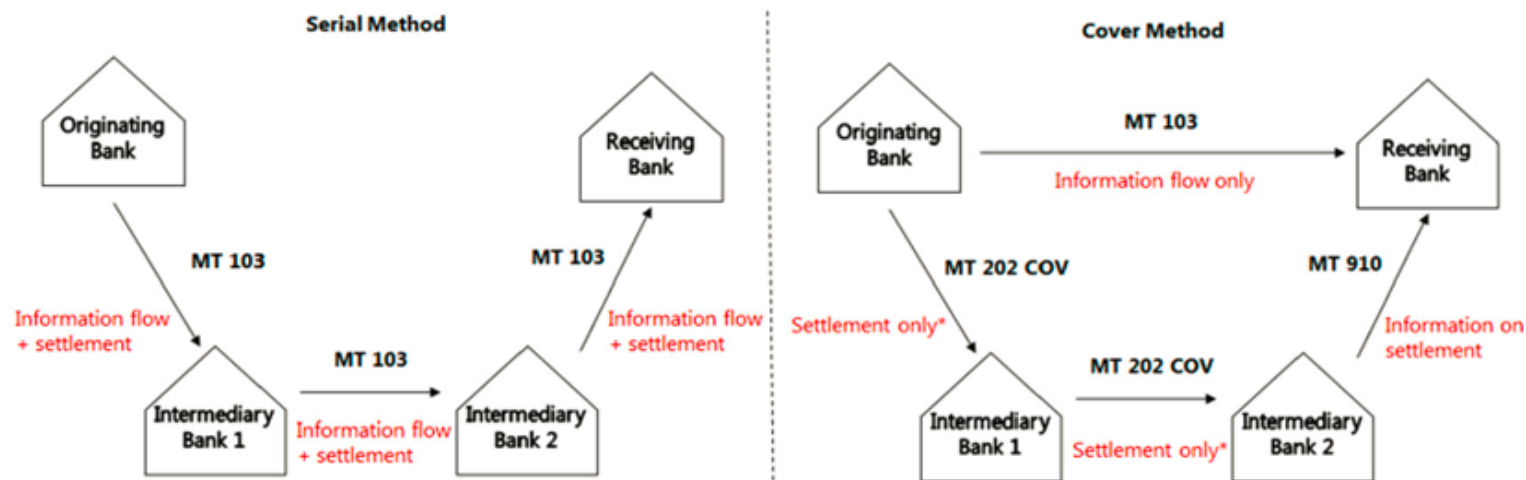
SWIFT message types (2)

1. MT 103—Single customer transfer, which instructs a funds transfer;
2. MT 202—General financial institution transfer, which request the movement of funds between financial institutions except if the transfer is related to an underlying customer credit transfer that was sent with the cover method, in which case the MT 202 COV must be used;
3. MT 202 COV—General financial institution transfer, which requests the movement of funds between financial institutions, related to an underlying customer credit transfer that was sent with the cover method;
4. MT 700—Issuance of a documentary credit, indicating the terms and conditions.
5. Other MTs not collected.

Methods used in channeling payments through the SWIFT network

Box 2. Stylized Examples of the Serial and Cover Methods for a Correspondent Transaction

The transparency of ordering customers and final beneficiaries underlying payment instructions was further enhanced with new message standards, called MT 202 COV, which helps improve the screening of transactions by intermediary banks against AML/CFT and sanctions requirements.



** The information on the underlying customer credit transfer is also provided for the reason of regulatory screening requirements, AML controls, etc.*

Source: CPML.

Data for Expanded Scope Template

- Transparency corruption index file
<https://www.transparency.org/research/cpi/overview>
 - The transparency index file (transparency.csv) contains the score of the different countries for 2012, 2013, 2014, 2015 and 2016. These periods correspond with the columns speriod1 to speriod5. The columns chperiod2 to chperiod5 gives the change of their score compared to the previous year.
- Dummy data file
 - Data.csv contains dummy swift data of 6 banks (Bank A to F of country XX and city YY; corresponding with the BIC8s BNKAXXYY to BNKFXXYY) covering July 2015 up to and including December 2016. The file contains USD as well as EUR payments data. To avoid challenges in working with dates in csv files the date in year and month has been split in the first two columns of the data file.

Analytical Tool in R

- Uses R programming language for data pre-processing
 - R - <https://www.r-project.org/>
 - Able to handle larger amounts of data
 - Able to simultaneously work with multiple data-frames (tables) in memory
 - Able to support different types of analysis and visualization
- Uses igraph package in R for network analysis
 - iGraph - <http://igraph.org/r/>

Analytical Tool in R (2)

- To start using the files you need to save them together in a folder on your computer. In line 36 you have to provide the directory of the folder. Once you have done this the code should be able to run and generate figures.
- The transparency index and data file are already defined in line 56 and 67 of the code.
- By changing the toggle menu (lines 107-114) you can run generate different network figures.
- Since data.csv only contains data for 2015 and 2016 you can only select period "5" or "6" in line 113.
- Currently the code takes automatically the 2016 transparency corruption index as this setting is defined in lines 510 to 514.
- When using actual country data, apart from changing the country code in the toggle menu also the country code in line 545 needs to be changed (currently set for country "XX").

Dummy SWIFT data set (MCM)

Year	Mth	Initial Ordering BIC8	Initial Ordering BIC8 name	Initial Ordering Count ry	BIC8 name	BIC8 Count ry	Counter party BIC8	Counter party BIC8 name	Counter party BIC8 Country	End Benefic iary BIC8 name	End Benefic iary BIC8 Country	End Benefic iary BIC8 name	End Benefic iary BIC8 Country	Mess age Type	Curre ncy	Net Amount (conv. USD)	Transac tions
2015	Jul	BNKAXXY		XX	BNKA XXYY	XX	GLOB		US	GLOK		US		MT10 3	USD	500000	10
2015	Jul	BNKAXXY		XX	BNKA XXYY	XX	GLOC		US	GLOK		TW		MT10 3	USD	16000	1
2015	Jul	BNKCCXY		XX	BNKCC XXYY	XX	GLOH		DE	GLOK		TW		MT 103	USD	10000	1
2015	Jul	BNKDXXY		XX	BNKD XXYY	XX	GLOK		IN	GLOK		IN		MT70 0	USD	27238	1
2015	Jul	BNKDXXY		XX	BNKD XXYY	XX	GLOK		US	GLOK		US		MT10 3	USD	6560442	130
2015	Jul	BNKDXXY		XX	BNKD XXYY	XX	GLOK		US	GLOK		SG		MT10 3	USD	18378	2
2015	Jul	BNKDXXY		XX	BNKD XXYY	XX	GLOK		US	GLOK		IN		MT10 3	USD	8167	2
2015	Jul	BNKAXXY		XX	BNKA XXYY	XX	GLOA		US	BQWW US44		US		MT10 3	USD	26000	1
2015	Jul	BNKAXXY		XX	BNKA XXYY	XX	GLOB		US	BQWW US44		US		MT10 3	USD	10000	1
2015	Jul	BNKDXXY		XX	BNKD XXYY	XX	GLOA		US	BQWW US44		US		MT10 3	USD	40658	3
2015	Jul	BNKDXXY		XX	BNKD XXYY	XX	GLOC		US	BQWW US44		US		MT10 3	USD	23943	1

Dummy SWIFT data set –pivot table (MCM)

data-pivot table example - Excel

PivotTable Tools: Analyze, Design

File Home Insert Page Layout Formulas Data Review View Power Pivot Analyze Design Tell me what you want to do

Normal Page Break Page Custom Ruler Formula Bar Gridlines Headings Zoom 100% Zoom to Selection New Window Arrange All Freeze Panes Hide Split Synchronous Scrolling Switch Windows Macros

Workbook Views Show Zoom Window Macros

BIC8 BNKAXXXY
Currency USD

Sum of Net Amount (conv. USD)

Column Labels 2016

Row Labels	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2016 Total	Grand Total
GLOB	51.11%	46.30%	44.68%	46.45%	47.34%	44.29%	45.08%	37.75%	20.66%	7.83%	7.11%	6.87%	34.65%	34.65%
GLOF	23.88%	33.61%	30.16%	28.95%	28.44%	34.48%	28.50%	32.99%	40.19%	36.65%	38.11%	37.23%	32.76%	32.76%
GLOA	19.06%	15.90%	21.02%	16.80%	20.38%	18.06%	21.20%	27.50%	35.46%	55.21%	52.79%	50.24%	28.60%	28.60%
BKKKUS55	3.91%	1.18%	2.80%	1.21%	0.78%	0.00%	2.58%	0.00%	1.96%	0.00%	0.46%	4.26%	1.55%	1.55%
GLOC	1.63%	2.91%	1.23%	6.43%	2.82%	3.00%	2.47%	1.21%	0.74%	0.15%	0.40%	0.07%	1.99%	1.99%
BNCNUS33	0.24%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.02%
GLOH	0.15%	0.05%	0.06%	0.13%	0.23%	0.09%	0.16%	0.19%	0.12%	0.13%	0.12%	0.02%	0.12%	0.12%
BNKWDEFF	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BNKOUS3M	0.00%	0.01%	0.04%	0.02%	0.01%	0.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%
GLOL	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
BNKBCLRM	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.19%	0.00%	0.00%	0.00%	0.02%	0.02%
BNKCMXMM	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.01%	0.00%	0.02%	0.02%	0.00%	0.01%	0.01%	0.01%
BAKEUS3M	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.37%	0.67%	0.01%	1.00%	1.30%	0.27%	0.27%
Grand Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

PivotTable Fields

Choose fields to add to report:

Search

☒ Year
☒ Month
☐ Initial Ordering BIC8
☐ Initial Ordering BIC8 name
☐ Initial Ordering Country
☒ BIC8
☐ BIC8 name
☐ BIC8 Country
☒ Counterparty BIC8
☐ Counterparty BIC8 name
☐ Counterparty BIC8 Country
☐ End Beneficiary BIC8
☐ End Beneficiary BIC8 name
☐ End Beneficiary Country
☐ Message Type

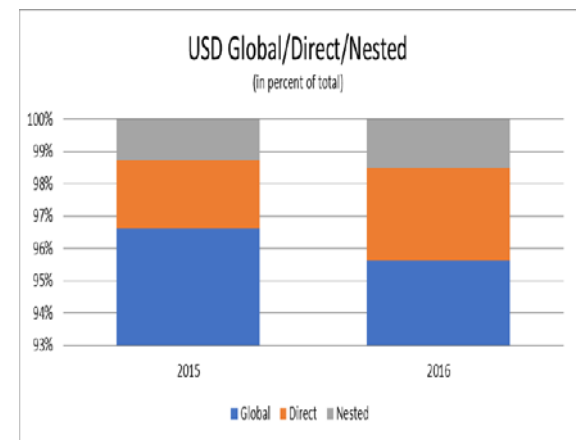
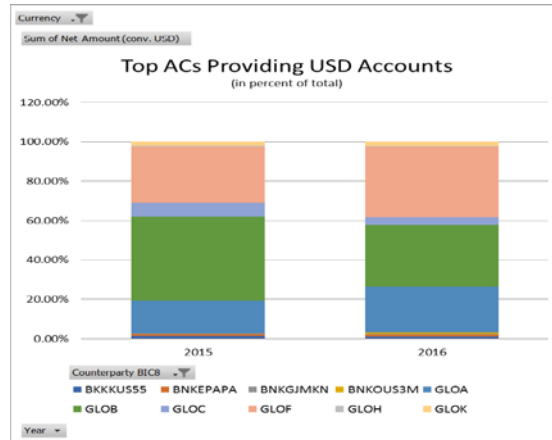
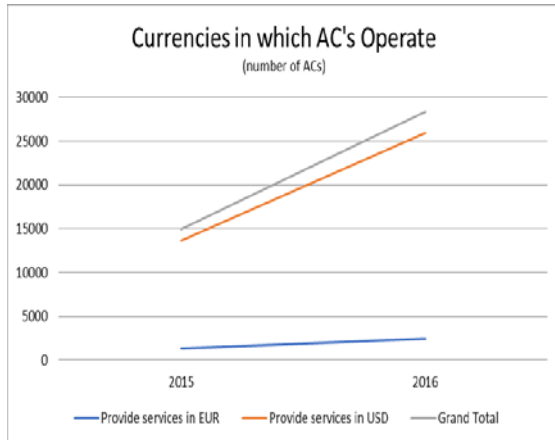
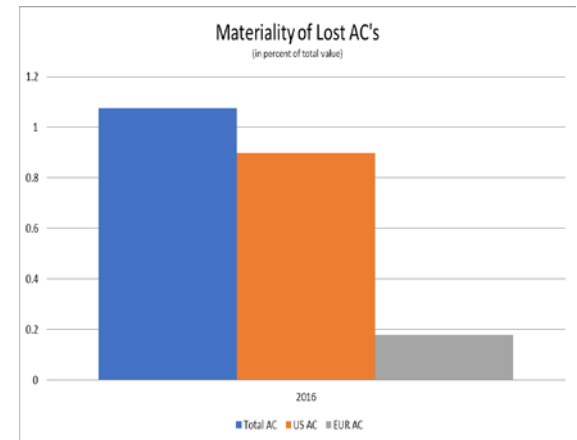
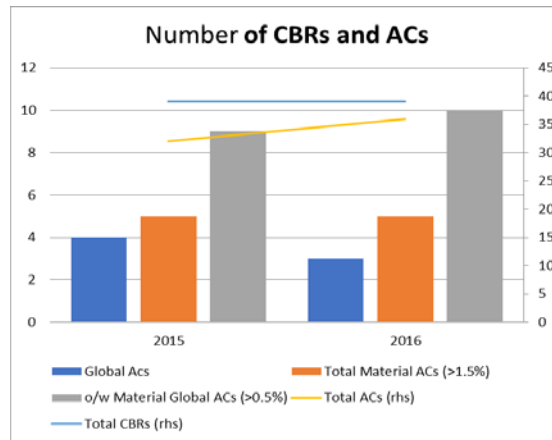
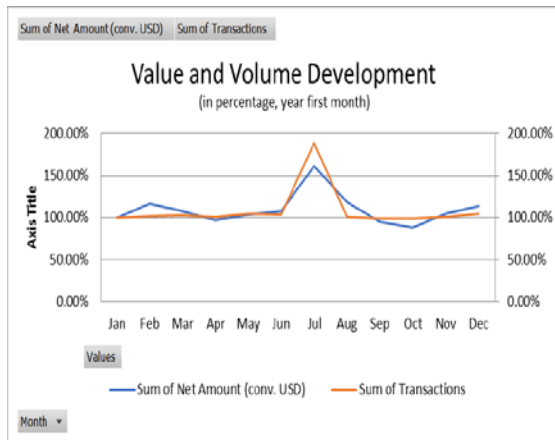
Drag fields between areas below:

Filters: BIC8, Currency
Columns: Year, Month
Rows: Counterparty...
Values: Sum of Net A...

Defer Layout Update Update

Ready data pivot table 130%

Examples of analytical output using dummy SWIFT data and pivot tables



Examples of network analytical output using the expanded scope framework

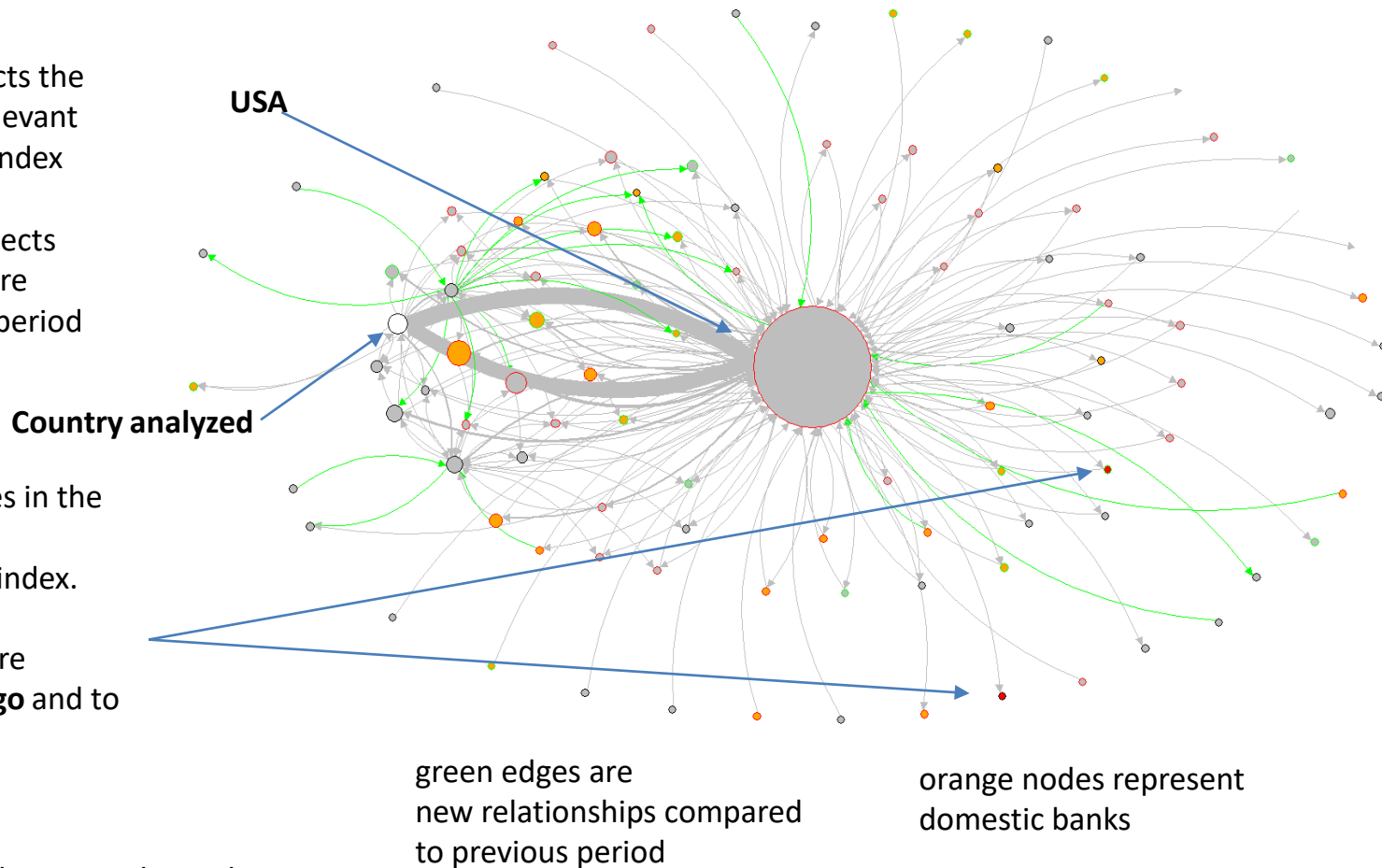
Analysis of countries to and from which USD flows are sent and received

Inside node color reflects the country score in the relevant period's transparency index

Outside node color reflects transparency index score compared to previous period

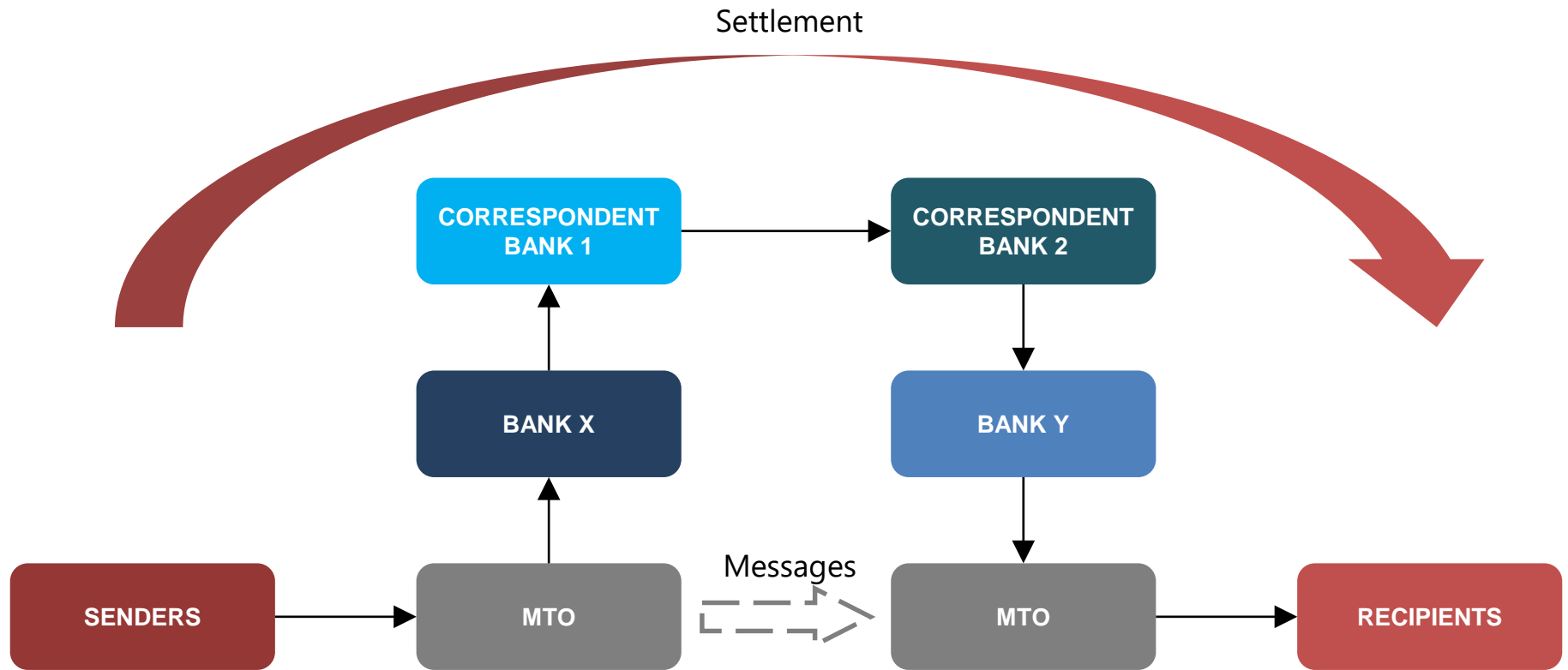
Red nodes are countries in the bottom quintile of the corruption perception index.

In this example there are observed flows to **Congo** and to and from **Haiti**.



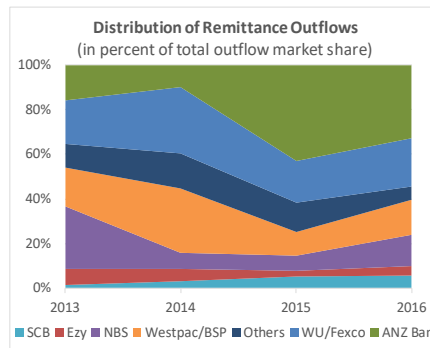
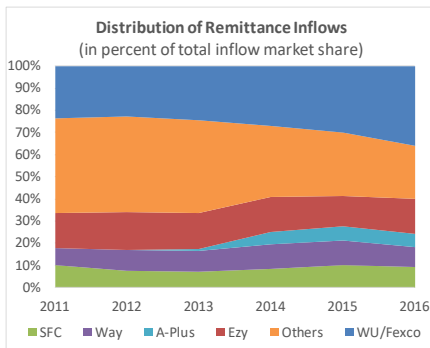
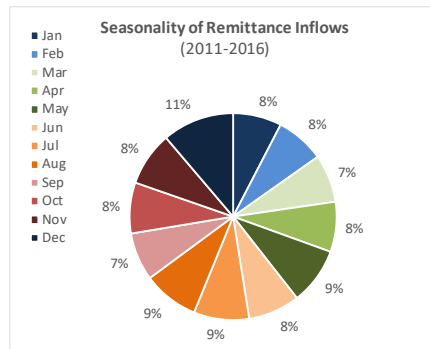
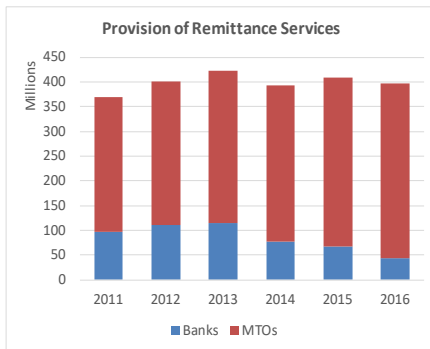
Source: Dirk Jan Grolleman and David Jutrsa

Additional Analysis - CBR Remittances Link



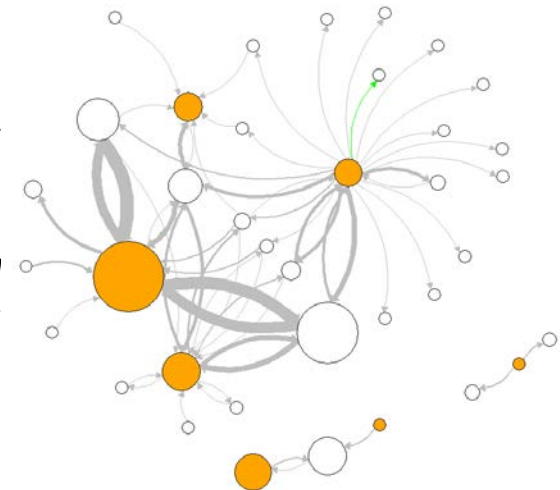
Additional Analysis - Remittances: Potential Links

A lot of insight from basic data collection



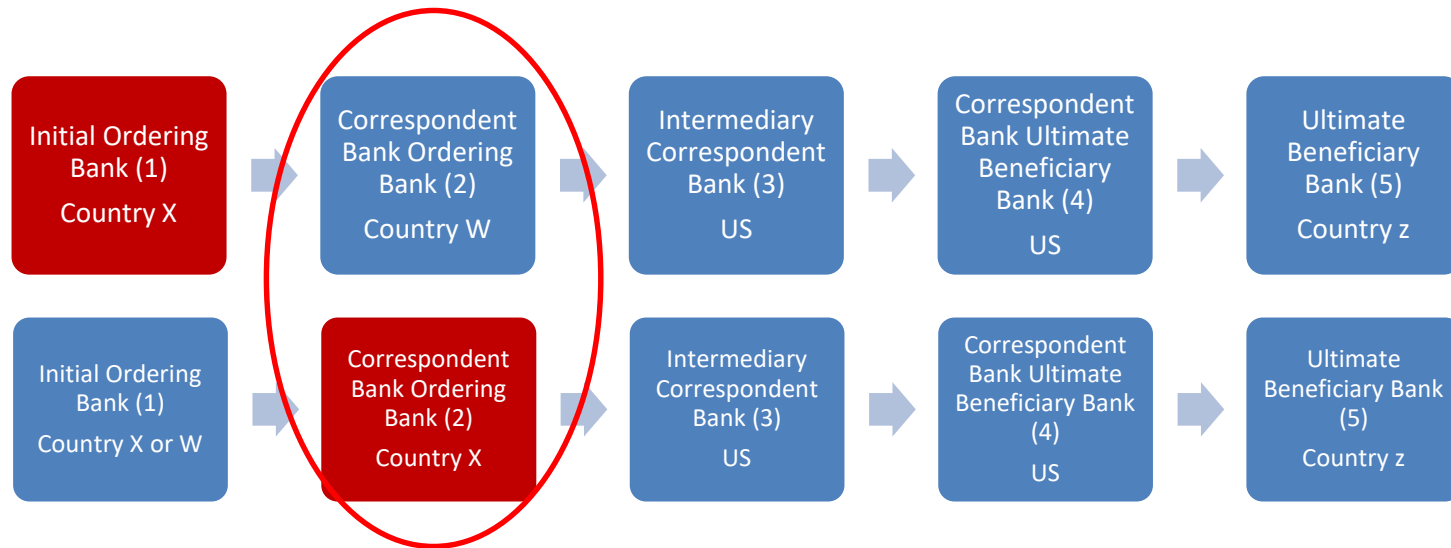
Layer MTO bank
account on top of
CBR flows?

*node size = scaled
share of domestic
MTO accounts*



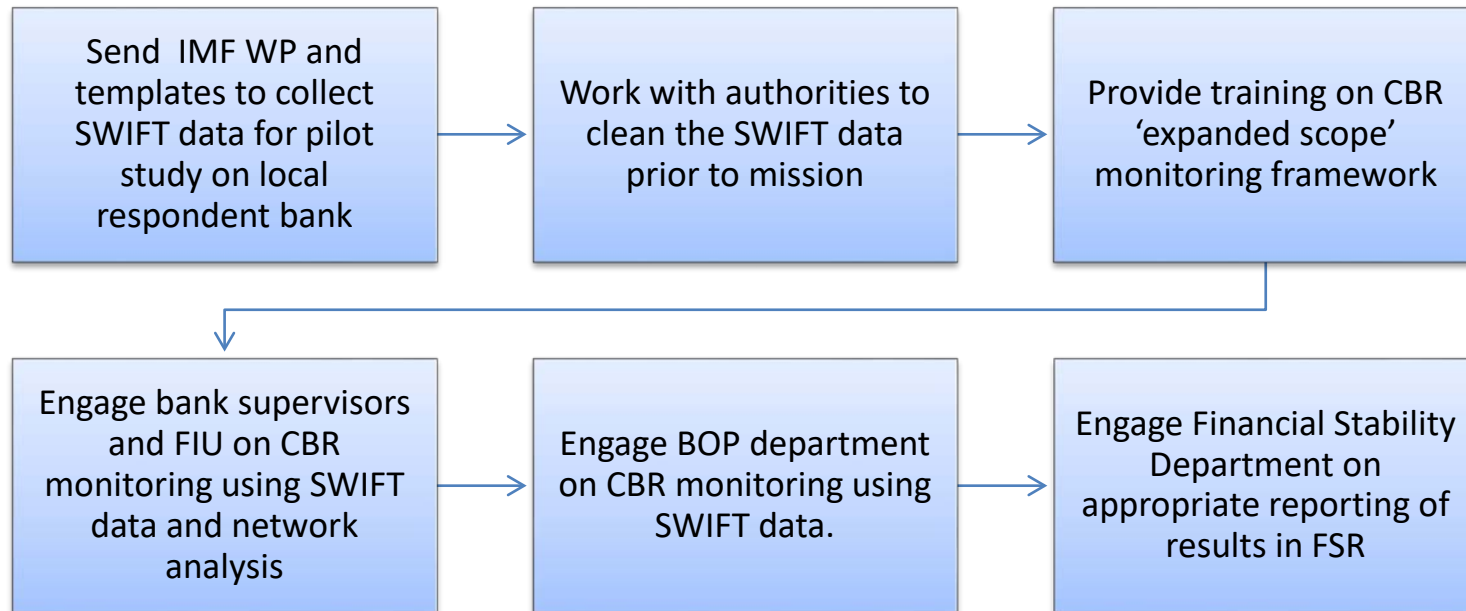
Stylized Nested Cross-Border Payment Chain

Nested U.S. dollar correspondent bank



The red blocks denote the reporting/supervised bank

CARTACTA on CBRs



References

1. IMF (2017): "Recent Trends in Correspondent Banking Relationships—Further Considerations," (SM/17/57). Available at:
<http://www.imf.org/en/publications/policy-papers/issues/2017/04/21/recent-trends-in-correspondent-banking-relationships-further-considerations>
2. IMF (2017): "Loss of Correspondent Banking Relationships in the Caribbean : Trends, Impact, and Policy Options," (WP/17/209). Available at:
<http://www.imf.org/en/Publications/WP/Issues/2017/09/29/Loss-of-Correspondent-Banking-Relationships-in-the-Caribbean-Trends-Impact-and-Policy-Options-45220>
3. IMF (2017): "Understanding Correspondent Banking Trends: A Monitoring Framework," (WP17/216) Available at:
<http://www.imf.org/en/Publications/WP/Issues/2017/10/04/Understanding-Correspondent-Banking-Trends-A-Monitoring-Framework-45318>

Thank
You

Q & A