Blockchain and International Trade: Preferential Utilization Rates for Exporters in Developing Countries and Implications for SDGs

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Outline

1. Objective of paper
2. What is blockchain
3. What is the problem
4. Potential role for blockchain technology and trade and SDGs
5. Modeling setup
6. Results
7. Conclusions

Objective of paper

- To examine the application of distributed ledger technology, or blockchain technology, in international trade
  - Specifically, through preferential utilization rates and trade facilitation
  - For exporters in developing countries and across the board
  - Potential economic effects in CGE framework

What is Blockchain?

Blockchain is a PROCESS of recording transactions through a digital ledger.
Transactions are public and verified by multiple computers to ensure ledger accuracy.

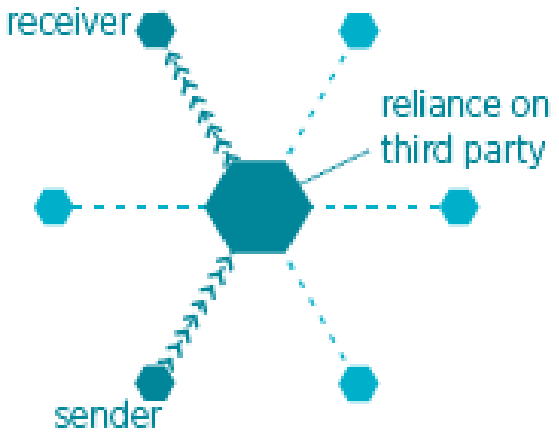
Connected Computers
Computers are on a peer to peer network, and can talk with each other without a middle man

Reach Agreement
Agreement is reached by consensus

Shared Data
Accuracy of all transactions are immediately verifiable.

Traditional

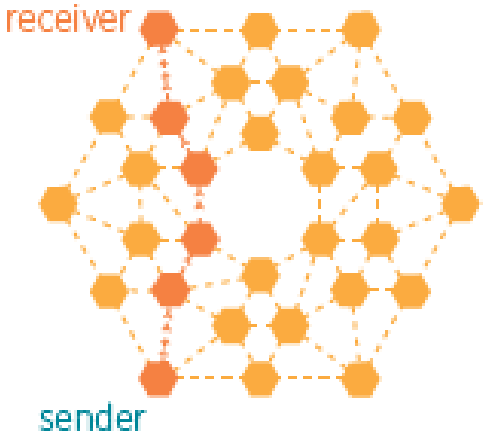
one institution manages transaction ledgers.



VS

Blockchain

multiple managers verify and update the ledger



What is the problem

- We are still far from realizing the full benefits of our trade policies
  - PURs < 100%; share of firms that engage in trade still extremely low…recent evidence that digital platforms and fintech can facilitate trade engagement….suggests that maybe optimal level of share of firms that trade is higher than existing
  - Economists have been on to this for awhile…."Enhanced trade facilitation"…..Wilson, Mann, Otsuki (2005)…$400 billion
  - PURs are pos(+) corr with shipping size, and margins (Lars 2015), which is consistent with the notion that there are costs to using them. Surveys show ROO are some of the most costly provisions.
- Why?
  - Administrative burdens; costly to prove origin of goods
  - Lack of trust
  - Too many intermediaries
  - Information asymmetries
  - Corruption
  - Unnecessary trade costs

PURs < 100%, and this has been known for several decades….

Table 1. MFN and preferential imports by importer

Import type	Australia		Canada		EU		USA	
	Imports (USD million)	%	*Imports (USD million)*	%	*Imports (USD million)*	%	*Imports (USD million)*	%
All imports	171,725	100.0%	341,169	100.0%	2,013,347	100.0%	1,914,677	100.0%
A - MFN zero	90,080	52.5%	215,299	63.1%	1,267,960	63.0%	912,903	47.7%
B - MFN > 0 / no preference	57,224	33.3%	27,418	8.0%	406,572	20.2%	552,908	28.9%
C - MFN > 0 / preference not used	9,531	5.6%	10,099	3.0%	43,240	2.1%	35,773	1.9%
D - MFN > 0 / preference used	14,891	8.7%	88,352	25.9%	295,575	14.7%	413,092	21.6%
C + D = preference-eligible	24,422	14.2%	98,451	28.9%	338,815	16.8%	448,865	23.4%
u_{value} = D / (C + D)	0.61		0.90		0.87		0.92	

Source: Keck and Lendle (2012), "New evidence on preference utilization," WTO.

Low, Piermartini, and Richerting (2008), "For nearly forty years [*50 now*], non-reciprocal preference schemes have sought to promote industrialization, boost exports, and foster growth in developing countries." See Resolution 21(ii) of UNCTAD II (1968) for the rationale of preferences.

Measuring trade costs….

OECD:

What reduction in trade costs is expected from implementation of the TFA?[2]

- The potential cost reduction from a "full" implementation of the TFA is 16.5% of total costs for low income countries (LICs), 17.4% for lower middle income countries (LMICs), 14.6% for upper middle income countries (UMICs) and 11.8% for OECD countries, based on analysis using the TFIs.
- If countries limit themselves to the mandatory provisions of the Agreement, the potential reduction reaches 12.6% for LICs, 13.7% for LMICs, 12.8% for UMICs and 10.4% for OECD countries.
- A higher level of ambition in implementing the best endeavours provisions of the TFA would generate very substantial benefits of 3.9, 3.7, 1.8 and 1.4 percentage points more than if countries only implemented mandatory provisions. The opportunity costs are particularly high for the low and lower middle income country groups, as many upper middle and high income countries already implement measures that are formulated on a "best endeavours" basis.

Potential role for blockchain technology

- What is blockchain? Hint: it is not Bitcoin.
  - Blockchain is a distributed ledger technology that enables connected computers to reach agreement over shared data.
  - Eliminates the need for an intermediary.
- Potential for blockchain in trade
  - Eliminates intermediaries (and admin burden)
  - Secures trust
- BC in conjunction with other new technologies can change the landscape in trade.
  - Smart contracts, Artificial Intelligence, Internet of Things
    - Just in time, being able to see the container in real time…can follow the entire process as it develops
  - So, think of BC as the new internet….then use AI on there, IoT, smart contracts…and it's a whole new world…..

Blockchain technology and trade

- Once the buyer and seller have agreed in principle to a transaction, the two key things that facilitate a cross border commercial transaction: trust, traceability.
- On the margin, exporters and importers in developing countries have the most to gain
- McDaniel and Norberg (2018) discuss role for blockchain technology across the international trade landscape, focus on three things…trade finance, customs, provenance of goods

Difference between blockchain and trade facilitation

- TFA is about working with customs, i.e., getting the truck through customs. The truck taking 1 day instead of 3 days. Business paperwork, etc.
  - But once it's on the ship…then they are in the paperwork world again…
- Blockchain goes from farm to fork. But every part of it matters. So implications of blockchain larger than TF.
- Trade facilitation is a gov't initiative to help at-the-border bottlenecks. Blockchain is the system across the board.
- Trade facilitation can be a precursor for blockchain

Traceability Throughout Trade

Immediate

Verified transactions are posted immediately

Verifiable

All parties can view transaction histories

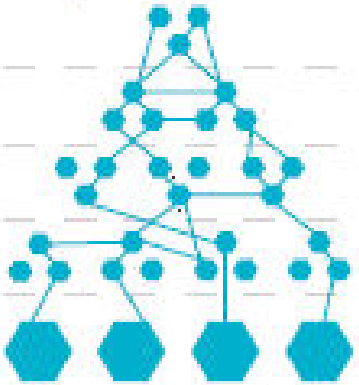
Immutable

It is virtually impossible to delete a verified transaction

Blockchain allows items to be tracked through each step of production.
Previously it was nearly impossible to
trace an item through out the trade process.

Traditional

impossible to trace



producer

exporter

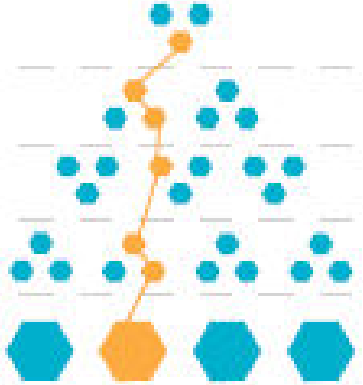
importer

buyer

customer

Blockchain

blockchain makes it traceable



Using Blockchain in Trade to Help Meet Sustainable Development Goals

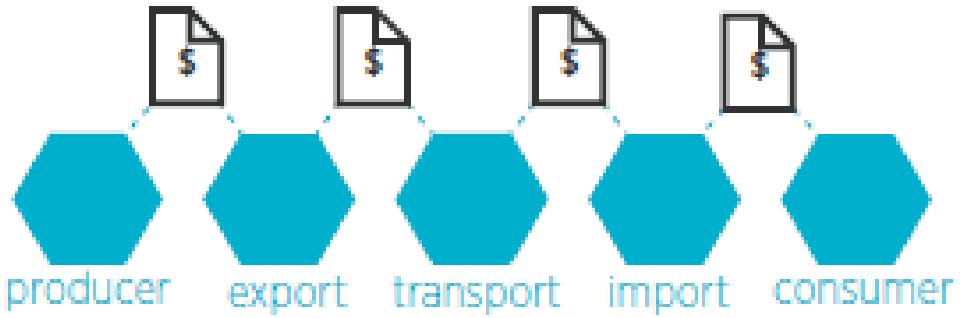
Using Blockchain in Trade to Help Meet Sustainable Development Goals

- Where do SDGs fit in?
- Lower trade costs, especially for developing countries
  - Lower costs for firms that currently engage in trade
  - Reduce entry barriers to trade
- Environment
    - 30% of food is lost from farm to fork.
- Public health
  - Access to medicines. Pharmaceutical sector has had a lot of access problems b/c of intermediaries….
- Corruption
  - Greater transparency. Integrity of institutions.

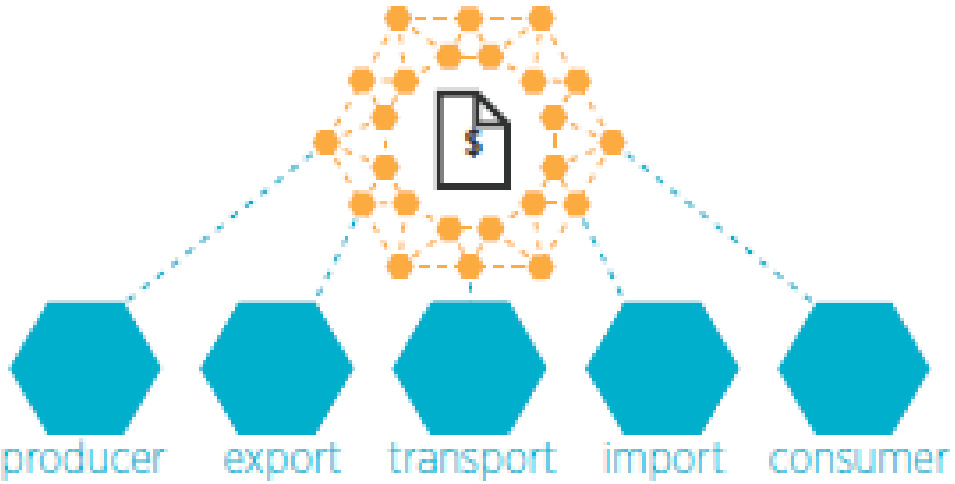
Blockchain and Customs

Blockchain can update customs procedures from costly and time consuming paper based processes to a digitized and integrated system. Necessary information could be easily viewed and shared by all parties.

Traditional



Blockchain



Policy experiment

- How can we use blockchain technology to increase preference utilization rates and facilitate trade?
  - Potential to reduce the expense and time required to facilitate the 80% of global trade that now depends on third party lending and insurance.
  - To reduce costs associated with export and import licenses, cargo manifests, and customs declarations.
  - Tracking origin of goods, could revolutionize how multinational producers and retailers manage their supply chains by providing detailed, real time information on the movement of goods

PUR methodology

- We employed an aggregated version of a novel dataset developed by ITC Geneva on utilization rates of preferences documented in Narayanan, Mimouni and Pichot (2015).
- This dataset has shipment transaction level data on tariffs actually applied on goods from all countries in the world to EU countries, USA and Canada.
-
- It also contains the tariff line code of the commodities traded and ITC has data on preferential and MFN tariffs for each of them.
- Based on the differences between actual and preferential tariffs, we compute the shocks in tariffs that would be needed for bringing down the existing tariff to a tariff level that's midway between the two. We implement these tariff shocks in the model.
-
- Most of these shocks are prominent among developed countries as importers and rest of the world as exporters but there are also instances particularly for USA where the developed countries as exporters may also have a lot to gain in preference utilization.

TF methodology

- There's a variable in GTAP model that can capture reduction in trade barriers without tariff revenue implicated.
- It's 'ams' : import augmented technological change for a given commodity, exporter and importer.
- Standard used in the literature for trade facilitation.
- We use the % reductions in trade costs assumed in the OECD report.
- Future modification planned: These shocks result in huge numbers so we are examining an alternative method to shock using the tariff variable without touching the tariff revenue, by using a tax replacement closure.

PURs and Trade Costs

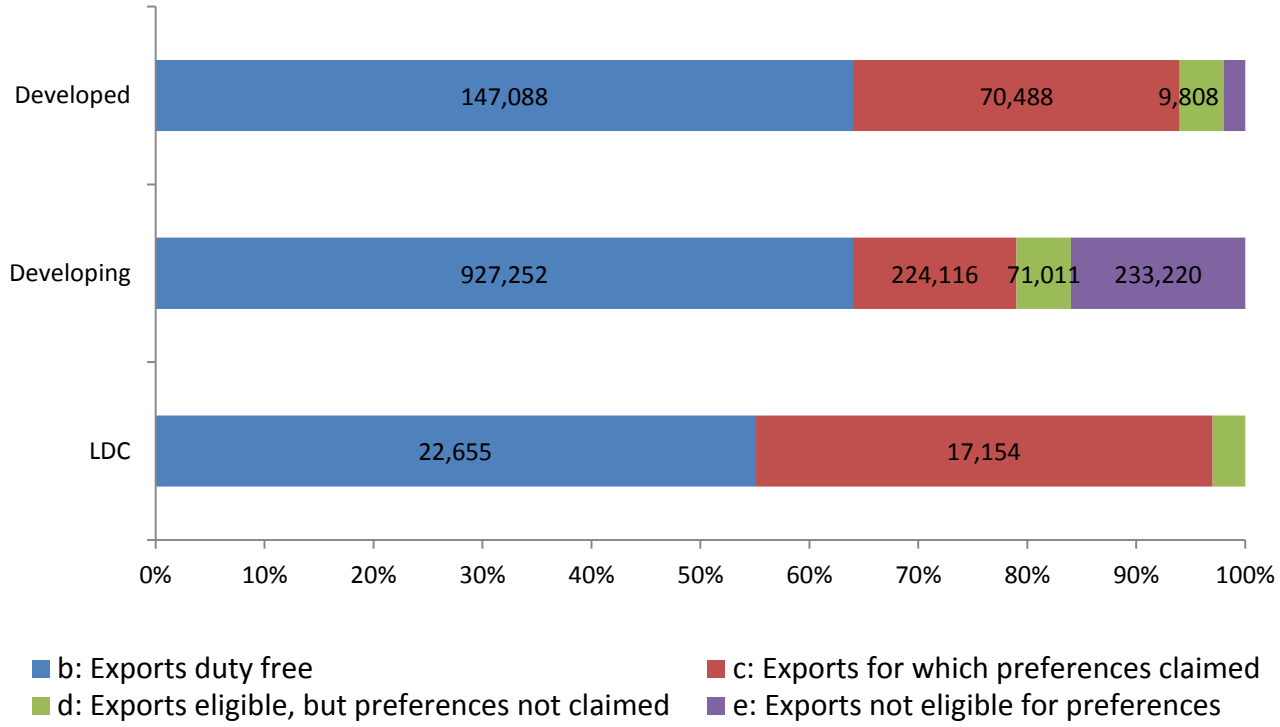
The Case of USA and EU: number of countries that are granted preferential treatment (2011)

Importer	Developed	Developing	LDCs	Total
EU	8	137	49	194
USA	6	101	45	152

Most of the tariff preferences by the EU and USA are provided to the developing and less developed countries.

PUR=c/(c+d)

EU imports by tariff treatments and category of development, $mln

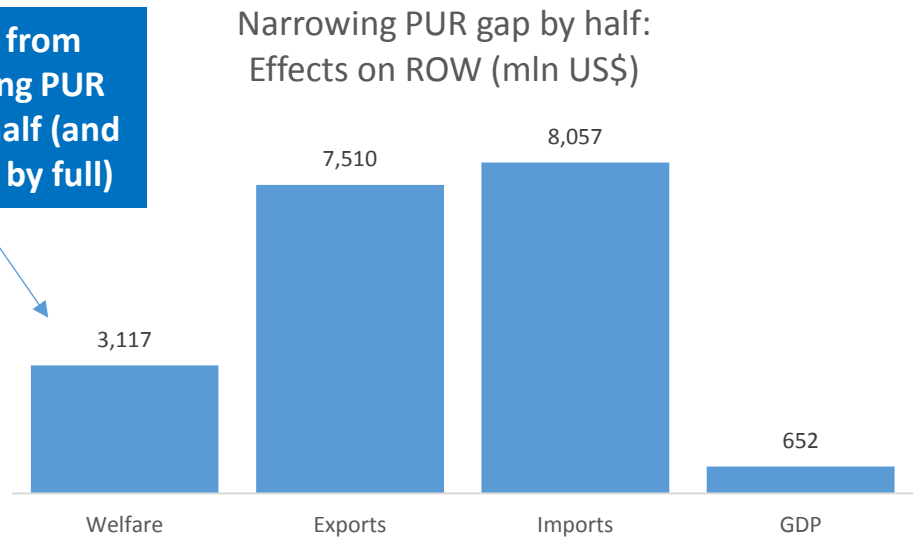


Heterogeneity across sectors and country pairs

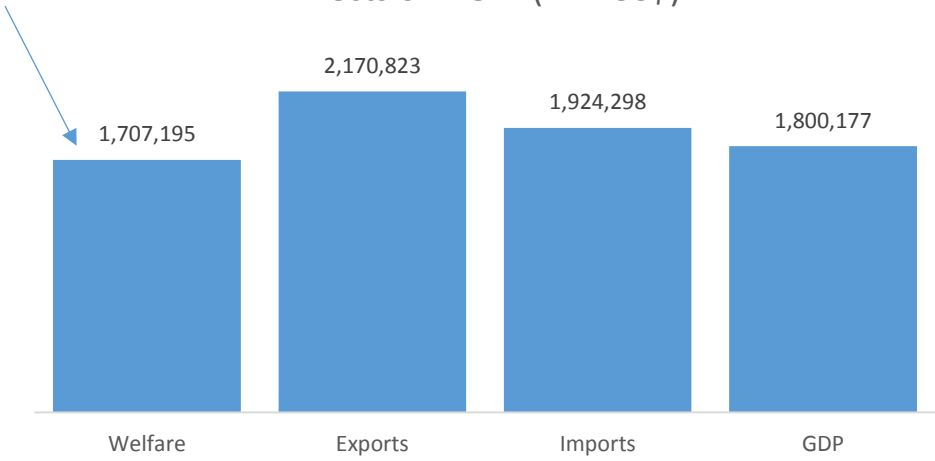
- Largest gaps remain in developing country exports
- N-S: Biggest gaps show up in ag, apparel, electronics, and N-S trade (a bit more EU than US…is compliance harder w/EU preferences, or does EU just have more programs?)
  - Germany wheat; France/Netherlands electronics
- N-N: But even dairy and wearing apparel from Canada to US
- From US to Canada

Effects on ROW (developing countries in here)

$3.1bln from narrowing PUR gap by half (and $6.7 bln by full)



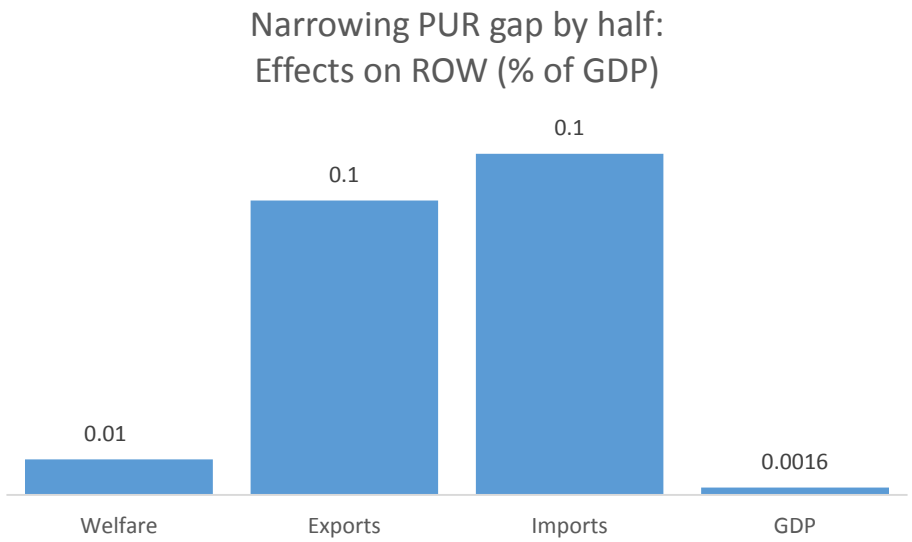
$1.7 trn doing TF, too

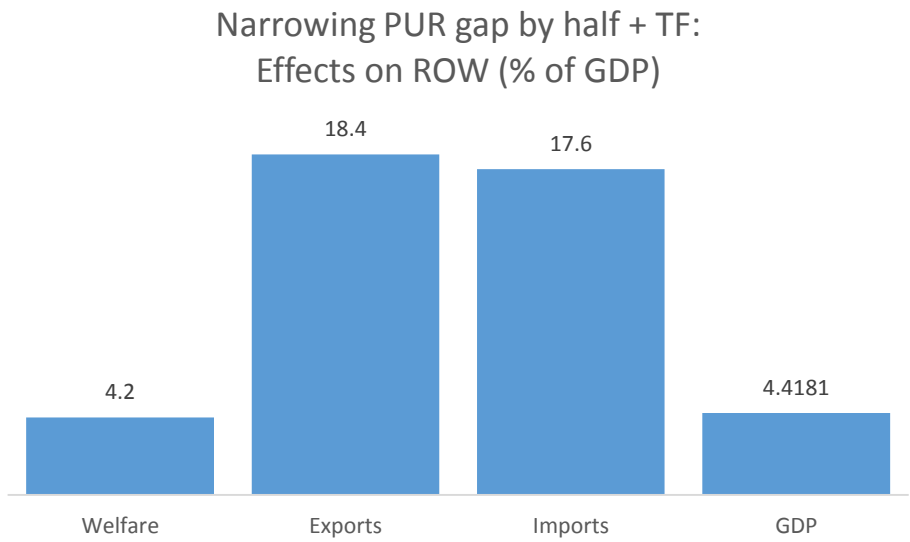


$3.1 bln from narrowing PUR gap by half; ($6.7 bln from narrowing PUR gap in full – not shown);
$1.7 trln from half PUR plus TF.

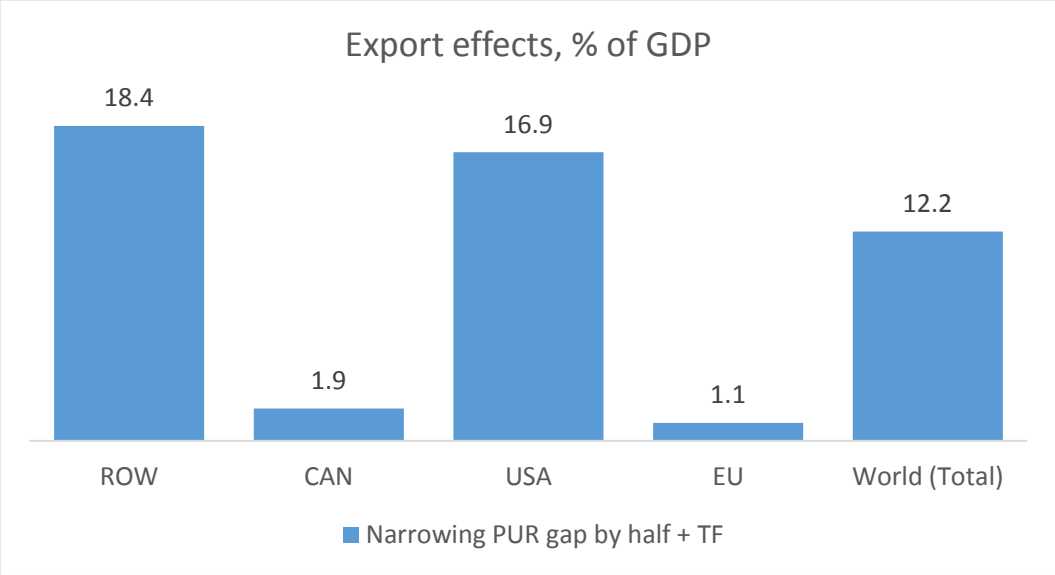
Effects on ROW (developing countries in here)

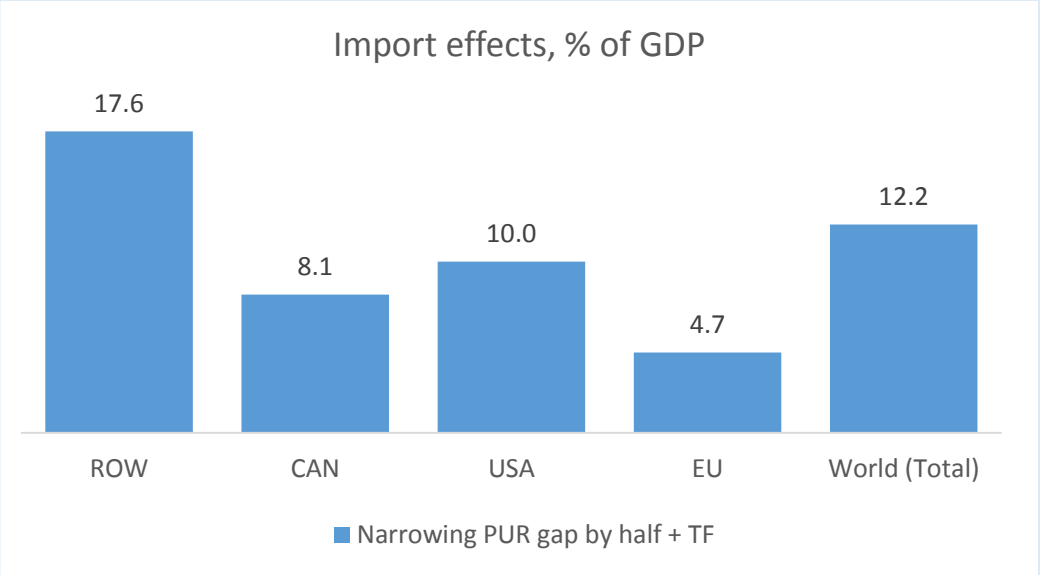
- Small but pos(+); and full PUR is about double
- Effects of TF far outweigh PUR



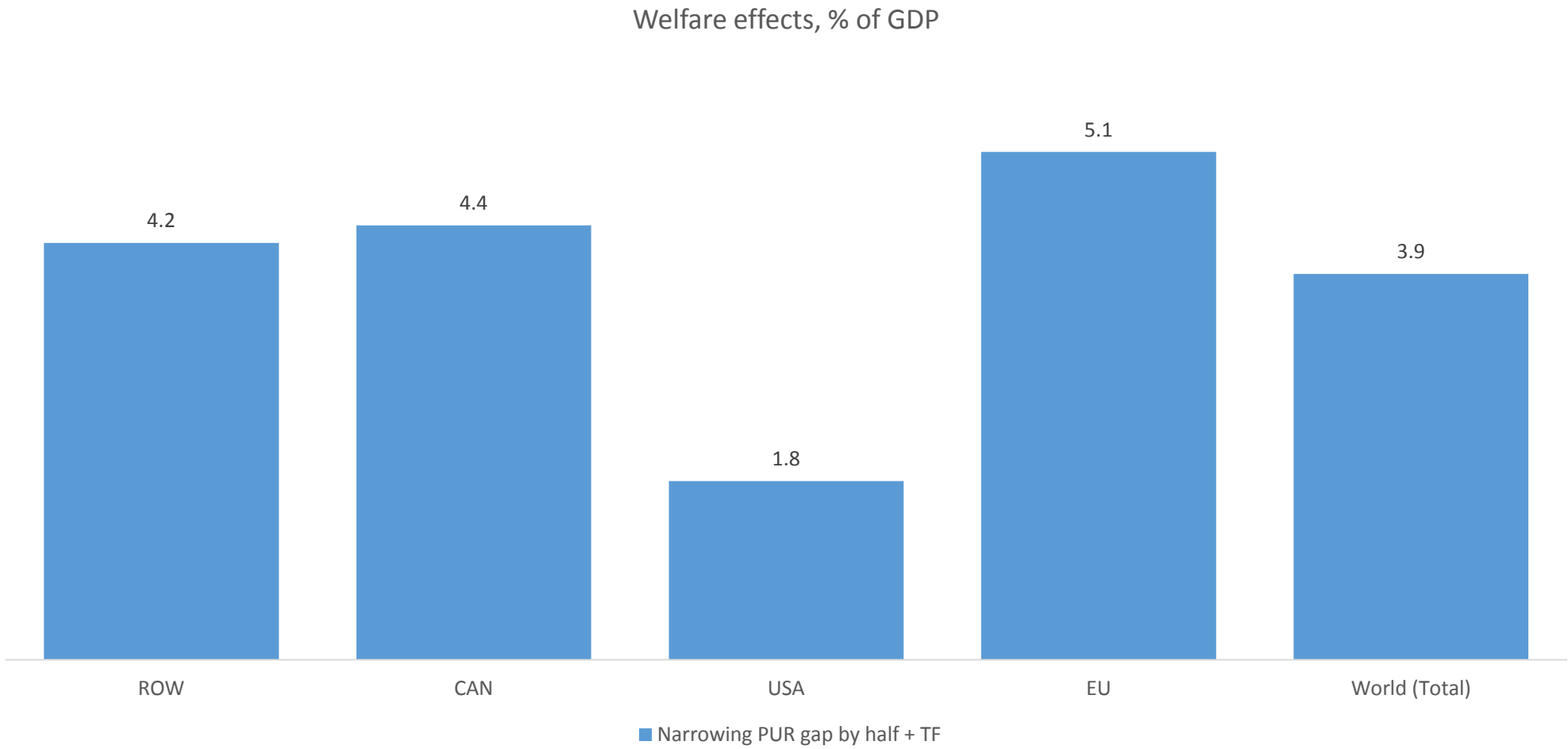


Results: trade effects





Results: welfare effects



Conclusion

- Blockchain technology has potential to facilitate disintermediation in international trade. Trade finance; customs; provenance of goods. Far reaching implications. An enabling technology.
- CGE results
  - The trade facilitation effects of blockchain far outweigh the PUR effects (not surprising)
  - Over $3 trillion using OECD TFIs.
  - As PURs increase across the board, developing countries all better off; some OECD countries are worse off—reflects trade diversion
  - The more interesting CGE results are the magnitude of effects across countries and why
  - The US generally has higher initial PURs; EU has lower PURs (and more programs) so more room to go.
  - PURs lower in sectors with low margins, or burdensome rules of origin

- Policy implications
  - Blockchain technology should be part of the Trade Facilitation Agreement and every FTA
  - Will take scalability and interoperability; will take time; will take commitment
  - Need a trial and error environment (don't over regulate). Gov't involvement should be like a loose garment.
  - Keep eye on the goal, and it's all measurable...PURs, increased trade, days to border, trade costs, even participation in trade (share of firms that export).

Fun history…to put this into perspective

- 1962, a scientist from M.I.T. and ARPA proposed a “galactic network” of computers that could talk to one another. Such a network would enable government leaders to communicate even if the Soviets destroyed the telephone system.
- 1965, another M.I.T. scientist developed a way of sending information from one computer to another that he called “packet switching.”
- 1969, ARPAnet delivered its first message: a “node-to-node” communication from one computer to another.
- Late 1970s, Vinton Cerf developed protocol as “the ‘handshake’ that introduces distant and different computers to each other in a virtual space.”
  - Cerf’s protocol transformed the Internet into a worldwide network.