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# **FACTORS IMPACT DIGITAL FINANCIAL CONSUMER PROTECTION IN 135 COUNTRIES FROM 2014-2018**

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- **Problem:**

- (1) Digital finance consumers are facing many disadvantages due to **asymmetric information** [**Complex terminology of documents for consumers** (Burke & Fry, 2019); **Difficulty of consumers in information processing and analysis** (Jin & Wagman, 2020); **Financial goods/services with new features**, *eg. winner-takes-all (Facebook), customer data mining (streaming platforms) (because of new technology)* (OECD, 2016a; World Bank, 2015), **domination of informal finance**, etc]
- (2) Vulnerable groups (low income, poor, women, etc) could be at more disadvantage even excluded - **Inequality**.
- (3) The lack of protective mechanisms will undermine social trust then adversely impacts on long-term growth (transaction cost) (OECD, 2011a) – **Negative externality**

⇒ *Need to know the state of DFCP in the world.*

⇒ *Draw some conclusions towards improving DFCP.*

- **Main contribution:**

- (1) Quantify the DFCP index in 135 countries around the world in the 2014-2018 period.
- (2) Identify the main factors affecting DFCP.
- (3) Provide some policy implications for improving DFCP.

- **Research questions:**

- How is the DFCP index measured and quantified?
- Which factor groups impact the DFCP index and which are the most important factors in the research period?
- How to improve DFCP in the future?

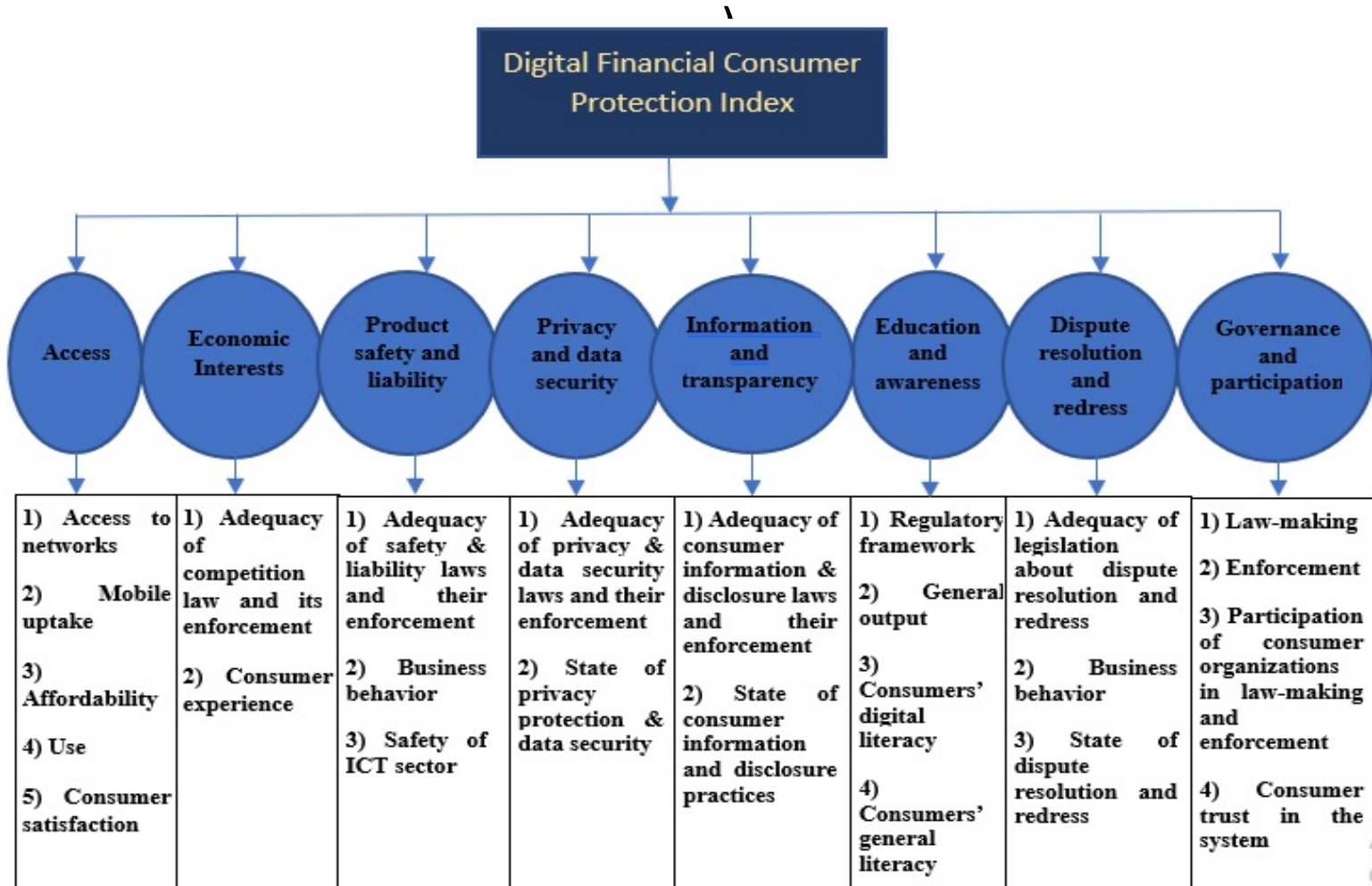
# Literature Review

(DFCP measurement)

Author	Finding
Chen (2018)	Qualitative analysis of overall structure of FCP policies for 13 countries
OECD (2016b)	The financial literacy score developed through out doing survey
World Bank (2012)	Do survey about consumer complaint and resolution mechanism
Federation of German Consumer Organisation (2017)	Define DFCP index through 25 aspects belong to 8 dimensions and its proxy data.
World Bank	Financial Inclusion Index ( <a href="https://www.worldbank.org/en/topic/financialinclusion">https://www.worldbank.org/en/topic/financialinclusion</a> )
	Global Index ( <a href="https://globalindex.worldbank.org/">https://globalindex.worldbank.org/</a> )

# Literature Review

(Federation of German Consumer Organisation (2017))



# Literature Review

(Factors affecting the DFCP index)

Author	Factors	Finding
Lumpkin (2010); Robert (2013); OECD (2017b); Polat & Abdulsalam, (2014); Rösner et al., 2020)	Financial Education and Society (+)	+ Improving consumer understanding (financial education, financial literacy, easy access to information, etc.) + Social trust is an important factor in improving the financial Inclusion (protecting the vulnerable group)
Mishra & Bisht (2013); Mushtaq & Bruneau (2019); Sarma & Pais (2011)	Infrastructure and Technology (+)	+ Information & Communication Technologies (ICT) has an important impact on aspects of Digital FCP ( eg access to banking services, digital banking development)
World Bank, 2018		Data transformation (from Bigdata) can effectively satisfy the diverse needs of consumers (higher security, improved financial goods/services)

# Literature Review

(Factors affecting the DFCP index)

Author	Factor group	Finding
Thakor (2012) OECD (2009) OECD (2011)	Market Size (+)	+ The expansion of the market reflects the higher competition pressure of the economy. + Increased competition contributes to the improvement of financial goods/services, eliminating monopoly in the market
Aghion & Howitt (1992); Romer (1990); Pakes & Griliches (1980); Marcia & Greta (2014); Chen(2018) Oya, Joyce, & Nataliya (2011)	Institutional Innovation (+/-)	+ Innovation-promoting mechanisms (R&D investments, research activities in universities, etc.) contribute to long-term growth, reduce transaction costs, and quickly solve problems arising for financial consumers. + The uncertain relationship between institution and financial service system
Fishbein & Woodall, 2006; Mohanty, 2014	Gender Gap	gender discrimination

# Literature Review

(Limitation)

- (1) There is no complete DFCP index in the world so far due to data limitations in the previous period.
- (2) Limited time and space and methodology.
- (3) There is no empirical model to evaluate factor groups impact DFCP index.



# Data Collection - DFCP measurement

(using PCA with 8 dimensions)

Variable	Describe	Source
<b>Access</b>	Denotes the percentage of respondents, ages 15-60+, who report having an account (by themselves or together with someone else) at a bank or another type of financial	Global Findex database ( <a href="http://datatopics.worldbank.org/financialinclusion/">http://datatopics.worldbank.org/financialinclusion/</a> )
<b>Economic interests</b>	The Network Readiness Index (NRI)	<a href="https://networkreadinessindex.org/#highlight">https://networkreadinessindex.org/#highlight</a>
	Getting credit: Distance to frontier (0-100). Denotes the distance of each economy to the “frontier,” which represents the highest performance observed on the getting credit indicator across all economies included in	World Bank, Doing Business ( <a href="http://www.doingbusiness.org/">http://www.doingbusiness.org/</a> ).
<b>Product safety and liability</b>	It is a trusted reference that measures the commitment of countries to cyber-security at a global level	ITU Global Cyber-security Index
<b>Privacy and data security</b>	Equal 1 if countries have a law about protection of personal database, equal 0 if otherwise.	<a href="https://unctad.org/en/Pages/DTL/STI_and_ICTs/ICT4D-Legislation/eCom-Data-Protection-Laws.aspx">https://unctad.org/en/Pages/DTL/STI_and_ICTs/ICT4D-Legislation/eCom-Data-Protection-Laws.aspx</a>

<b>Information and transparency</b>	<p>Disclosure index (0-5). The sum of a variety of existing disclosure requirements. These are (a) law specifies disclosure requirements in plain language, (b) law specifies disclosure requirements in local language, (c) law specifies requirement for prescribed standardized disclosure format, (d) law specifies requirement for recourse rights and processes, and (e) law specifies disclosure requirement of annual percentage rate using standard formula for credit products.</p>	<b>World Bank,</b> Global Survey on Consumer Protection and Financial Literacy.
<b>Literacy and awareness</b>	<p>Adult literacy (25%) + School life expectancy (25%) + Mean years of schooling (25%) + Tertiary enrollment (25%)</p>	GSMA Mobile Connectivity Index
<b>Dispute resolution and redress</b>	<p>Dispute resolution index (0-1). Index reflecting the existence of formal internal and external dispute resolution mechanisms. Takes the value 1 if both resolution mechanisms are available, the value 0.5 if one of the mechanisms is available, and 0 if neither of the mechanisms is available.</p>	World Bank, Global Survey on Consumer Protection and Financial Literacy.
<b>Participation</b>	<p>Generic Top-Level Domains (gTLDs) and Country Code Top-Level Domains (ccTLD) per person (20%) + Online Service Index score for E-Government (20%) + Mobile social media penetration (30%) + Mobile apps developed per person (30%)</p>	GSMA Mobile Connectivity Index

# Factor groups affecting DFCP index

- **Panel data** is used with 135 countries in the 2014-2018 period.
- Four factor groups are considered to impact the DFCP index, including
  - (1) Financial Education & Society:** Regulation instruction, financial literacy rate, easy access to information, Government efficiency, Business impact of malaria/Tuberculosis/HIV-AIDS.
  - (2) Infrastructure and Technology:** Availability of latest technologies, Firm-level technology absorption, FDI and technology transfer, Individuals using Internet, Fixed broadband Internet subscriptions
  - (3) Market size:** GDP, Exports as a percentage of GDP, Domestic market size index, Foreign market size index
  - (4) Institutional Innovation :** Capacity for innovation, Quality of scientific research institutions, Company spending on R&D, University-industry collaboration in R&D, Gov't procurement of advanced tech products, Availability of scientists and engineers

All of them were collected from **Global Competitive Index and Global Index, OECD**. Control variable: Gender gap in social media use (**Mobile Connectivity index**)

# Factor groups affecting DFCEP index

- Research model:

$$DFCEP_{nt} = \alpha + \sum_{h=1}^4 \beta_h \cdot X_{nht} + \gamma \cdot Z_{nt} + e_{nt} + \theta_t$$

We use fixed effect model and:

+ Robust standard error was implemented following the method of Arellano (1987), HC3 by MacKinnon & White (1985) to restrict heteroskedasticity.

+ Tests to ensure the appropriateness of the model, such as the Hausman test (compared random-); time- fixed effects testing, etc.

Symbol	Expectation
Financial Education & Society ( $X_1$ )	$\beta_1 > 0$
Infrastructure & Technology ( $X_2$ )	$\beta_2 > 0$
Market Size ( $X_3$ )	$\beta_3 > 0$
Institutional Innovation ( $X_4$ )	$\beta_4 > 0$
Gender gap – Control variable ( $Z$ )	$\gamma$
$e$	Error term
$\theta$	latent
$N = 135$	Countries
$T = 5$	2014-2018

# Results

(DFCP index)

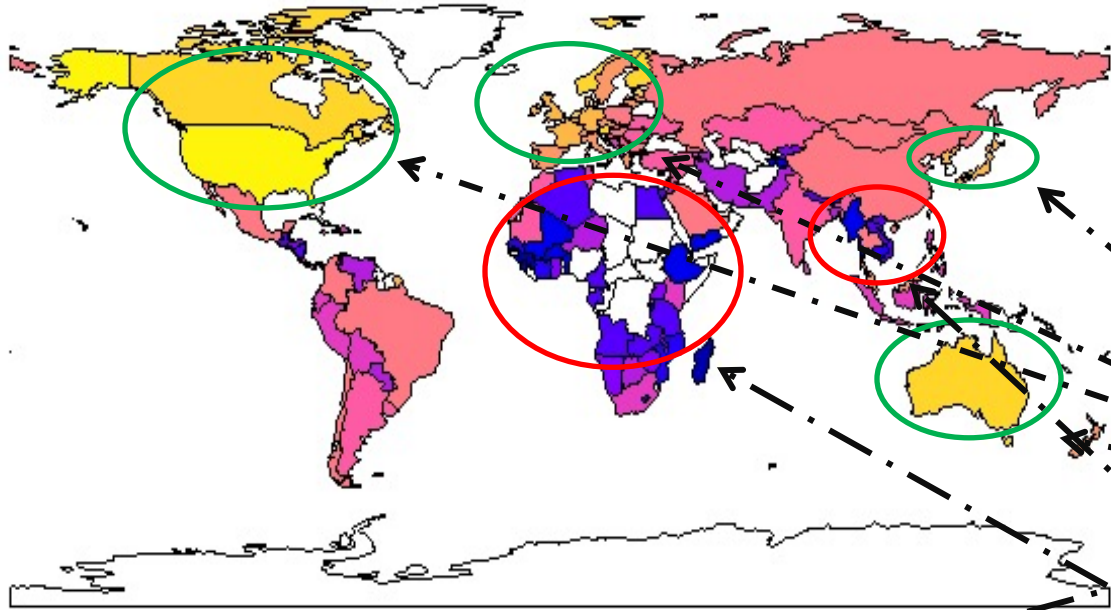
**World DFCE index, G20 countries, developing countries in 2014-2018 period**

	World				G20 countries				Developing countries			
	Min	Max	Mean	Sd	Min	Max	Mean	Sd	Min	Max	Mean	Sd
2014	-3.45	2.61	-0.23	1.53	0.42	2.18	1.37	0.53	-3.11	1.35	-0.88	1.18
2015	-3.38	2.67	-0.14	1.52	0.54	2.2	1.44	0.53	-3.38	1.45	-0.8	1.2
2016	-3.29	2.79	-0.02	1.51	0.62	2.23	1.52	0.5	-3.29	1.61	-0.67	1.19
2017	-3.19	2.89	0.09	1.51	0.73	2.26	1.6	0.48	-3.05	1.77	-0.55	1.16
2018	-2.97	2.94	0.3	1.5	0.81	2.46	1.83	0.46	-2.9	1.88	-0.34	1.16

To consider the reasonableness of the results we perform:

- (1) Comparison with previous studies about DFCE (e.g. Chen, 2018)
- (2) Compare between G20's DFCE index and DFCE index of developing countries (t-test)
- (3) Compare with some relevant indicators (financial Inclusion; Global Findex)

# Digital Financial Consumer Protection 2014



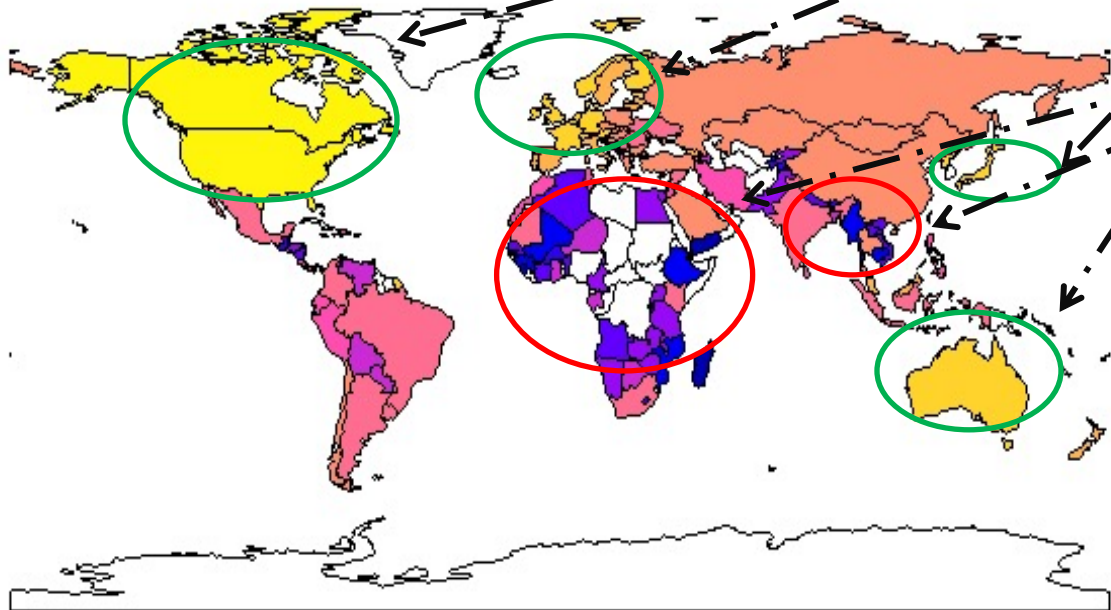
DFCP index is shown on the world map:

DFCP index is shown correspondingly by color scale.

- North America, Western Europe, Asia Pacific and Japan have the highest DFCP index (Chen, 2018; Zhao, 2020)

- Africa & ASEAN (Vietnam, Lao, Cambodia, etc) have the lowest DFCP index (OECD, 2018b)

# Digital Financial Consumer Protection 2018



The color shift (from dark blue to yellow) indicates a change of DFCP index

E.g. Canada, Some countries belong to Sub-Saharan Africa, Russia and China

# Results

(Regression)

Dependent variable: Digital Financial Consumer Protection Index (panel 135 countries in the 2014-2018 period)						
	(1) Fixed	(2) Fixed	(3) Fixed	(4) Fixed	(5) Random	(6) Fixed
Financial Education & Society	0.3143*** (0.0613)				0.2365*** (0.0399)	0.1799*** (0.0458)
Infrastructure & Technology		0.6433*** (0.0394)			0.5601*** (0.0348)	0.4677*** (0.0379)
Institutional Innovation			0.6037*** (0.0667)		0.1291*** (0.0495)	0.1929*** (0.0560)
Market size				1.0755*** (0.0869)	0.4120*** (0.0410)	0.7601*** (0.0728)
Gender Gap (Control variable)					0.0070*** (0.0012)	0.0055*** (0.0015)
Intercept					-6.0887*** (0.2205)	
Observations	651	651	651	651	651	651

*\*, \*\*, \*\*\* - statistically significant at the 10, 5, and 1%.*

# Results

(Regression)

Dependent variable: Digital Financial Consumer Protection Index  
(panel data with 135 countries in the 2014-2018 period)

	(7) Fixed - Arellano	(8) Fixed – HC3	
<b>Financial Education &amp; Society</b>	0.1799*** (0.0554)	0.1799*** (0.0566)	Rösner et al., 2020 Polat & Abdulsalam, 2014
<b>Infrastructure – Technology</b>	0.4677*** (0.0425)	0.4677*** (0.0435)	Sarma & Pais, 2011 Shamim, 2007
<b>Institution - Innovation</b>	0.0425*** (0.0735)	0.1929** (0.0746)	Mushtaq & Bruneau, 2019)
<b>Market size</b>	0.7601*** (0.0836)	0.7601*** (0.0882)	Chen, 2018 <b><u>The strongest effect</u></b>
<b>Gender Gap (control variable)</b>	0.0055 (0.0038)	0.0055 (0.0049)	OECD, 2009; OECD, 2011a
<b>Observations</b>	651	651	Fishbein & Woodall, 2006; Mohanty, 2014

\*, \*\*, \*\*\* - statistically significant at the 10, 5, and 1%.



# Conclusion

- Quantifying DFCP index through 8 dimensions, including: *access; economics interests; Product safety and liability; Privacy and data security; Information and transparency; Literacy and awareness; Dispute resolution and redress; Participation* then provides the overview of DFCP status in the 2014-2018 period over 135 countries.
- Four key factors affecting DFCP index: *Financial Education & Society; Infrastructure & Technology; Market Size; Institutional Innovation* → Market size has the strongest impact
- Solutions to improve DFCP due to the increasing and exacerbating of asymmetric information and inequality for digital financial consumers (compared to agencies).

# Conclusion

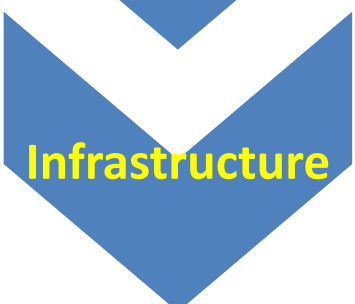
(How to Improve DFCEP)



- Increasing competition pressure of the economy (e.g. joining bilateral and multilateral agreements; improving government's accountability; perfecting the legal system, etc.)



- Support for research and innovation (e.g. R&D investment)



- building and improving digital platforms (internet coverage, internet speed, ...)



- Improve consumer understanding through training, learning, studying and self-awareness. The Government provides regulations to make transparent information, improve accountability; and provide consistent sources of official information and financial support.

- **THANKS FOR YOUR ATTENTION!**