INDUSTRIAL POLICY
A Scientific Journal Dedicated to Economic Development and Industrial Policy

OPEN ACCESS

Research Article

www.indpol.org

IndPol, 2023; 3(1): 21-41

Digital Divide, Credit Financing and Financial Inclusion: Changing Patterns of Poverty, Employment, and Income Inequalities

Muhammad Ayub Mehar[a]

[a] The Employers' Federation of Pakistan, Economic Advisor, Pakistan, ORCID: 0000-0002-9711-2556

Abstract

The role and effectiveness of financial inclusion and information technology to protect the lower income groups has become an important area of concern after Covid-19. The main objective of this study is to examine the impacts of information technology on poverty, income inequality and unemployment. The study is based on 14 years data of 148 countries. The results are statistically significant and parameters are robust in different alternative scenarios. Empirical evidences confirm the effectiveness of the use of internet, mobile banking and credit flows by fintech and big technology companies for poverty alleviation, creation of employment and GDP growth..

Article History
Received July 4, 2023
Revised July 10, 2023
Accepted July 13, 2023

Keywords
Domestic Credit, Financial Inclusion, Fintech Companies, Gini-index, Poverty Headcount ratio

JEL Codes
E51, G21, I32, O33

1. Introduction

A declining gap in GDP between the countries was observed during the last two decades. However, a visible widening in rich-poor gap within the countries was also noted. Despite, a general perception that globalization will reduce the rich-poor gap, the rich have become richer and the poor even poorer during the last two decades. World Bank has indicated that inequality between and within countries has often accompanies by greater economic globalization (Ocampo: 2005). This rising of rich-poor gap was observed even in the industrialized countries including the United States, Canada, and Britain. The changes in the patterns of wealth distribution are similar in Africa, Asia and Latin America. According to Ocampo (2005), 80 percent of the world's domestic product (GDP) belongs to one billion people living in the industrially developed world, while the remaining 20 percent is shared by other people living in developing countries.

It was expected that revolutionary changes in information and communication technologies (ICT) will reduce the rich-poor gaps through efficient utilization of human resources. Unfortunately, it cannot play its role unless its understanding and accessibility to common peoples. Even it can widen the income inequalities if peoples in lower income groups are not able to afford the cost these contemporary technologies. Now, there are two categories of peoples almost in every country, particularly in least developed countries: First category belongs to the affluent peoples who have achieved the ability of culture adoptability because of their education, frequent travelling, trainings, investing their monetary resources, and developing their cross-border contacts. The other part belongs to the peoples who do not have ability to get the benefits of globalization and they will have to live in isolation without knowing the contemporary world. The situation may lead social unrest, rebellions and insurgencies against the system. This situation may be more threatening as compared to the cold war era, when world was divided geographically in two parts. The state of poverty and income inequalities have rapidly further worsened due to global pandemic in 2019-20.

CONTACT Muhammad Ayub Mehar ayubmehar@yahoo.com

It was pointed out by Gunderson (2020) that the greatest wealth transfer in history would take place during three years of Covid-19 crisis. The new technologies lead to change in the pattern of growth. History of development reveals that the changes in the patterns of growth may lead the growing gap between winners and losers. This growing gap may be among the peoples, companies, economic sectors and countries. The growing use of information technology may widen the rich-poor gap if its benefits are not distributed evenly. In this regard, it is notable that use of financial technology, financial literacy and financial inclusion are the interrelated phenomena.

Before, exploring the relations between financial inclusion, information technology and poverty, it is important to understand the common perception about the cause of poverty. It is interesting that reasons for their poverty which are commonly perceived by the peoples are classified in 3 categories: (1) Luck or fortune; (2) Lack of efforts or capabilities at individual levels; and (3) Role of Policy makers. Poverty by inheritance, family structure, individuals working habits, health related issues of family members, natural disasters, civil wars, and change in climate conditions may be responsible for poverty and economic miseries of individuals and families. Such unanticipated conditions may shift an individual or a family at below the poverty line, while some peoples consider such conditions as a matter of luck or fortune. Sometimes, inordinate risk-taking activities by an individual, flawed planning and ill working habits may create economic miseries which are classified as issues at individual level. However, in considering the causes of poverty the role of economic system and policies cannot be ignored. The consequences of flawed economic system, ill planning, inefficiencies and corruption of policy makers and economic managers should not be transferred to those who are not responsible for such policies and actions. The spread of new technologies, rules and regulations for creating informational efficiencies, regulatory support for use of financial technology (Fintech), financial literacy, diversion of banking facilities and financial inclusion, monetary system and access to financing facilities are included in those policy variables which can affect the level of poverty in a country. Such policies determine the magnitude of poverty, unemployment, and labor participation in economic activities.

Multiple dimensions of the causes of poverty and inequality have been covered in economic literature. In the present context, World Bank (2020) has identified three factors which are responsible for the increase in global poverty and that threaten to extend its effects far into the future. The climate change, armed conflict and covid-19 are included in these factors. However, the impacts of the growing use of information technology on poverty and employment need to be properly assessed on empirical basis. It has been mentioned earlier that declining rich-poor gap and alleviation of poverty was expected by the globalization and revolutionary changes in the use of information and communication technology (ICT). However, its assessment on the basis of empirical evidence is still required. This study fills this gap.

The main objective of the study is to examine the impacts of information technology on poverty, income inequality and unemployment. This study is limited to examine the use of information technology in determination of the poverty, share of lowest 20 percent population in total income, Gini-index, rate of unemployment and labor participation rate, while use of information technology was measured through flow of funds by fintech companies, use of internet and mobile phone for transfer of money. The study is based on empirical evidences.

The next section of this study discusses the findings of previous studies related to poverty, financial inclusion and information technology in contemporary world. Section: 3 describes the global changes and comparison in the magnitudes of poverty, unemployment, GDP, use of financial technology and banks' credit to private sector. Section: 4 establishes a statistical model and methodology for empirical analysis. The empirical evidences and findings based on estimated parameters have been explained in section: 5, while conclusions and some policy implications have been described in section: 6.

2. Review of Literature: Income Distribution, Financial Inclusion, and Information Technology

Various studies have established the links between economic growth and the use of financial technology. It has been concluded that use of electronic mode of financing during the pandemic crisis may set off economic losses to some extent. Mehar (2021) found that higher share of population receiving payments by digital modes and the use of "Fintech" for payments of bills or to buy something online are significant and robust determinants of trade in services. While, the fintech was defined by Marlene, Huang, Morgan, and Shirai (2019) as "Advanced technology to improve and automate delivery and use of financial services to consumers and businesses". It covers a broad landscape from digital currencies and payment systems (e.g., mobile phone wallets, crypto-assets, remittance services) to asset management (e.g., internet banking, online brokers, robo-advisors, crypto-asset trading, personal financial management, mobile trading) to alternative finance (e.g., crowd funding, peer-to-peer lending, online balance sheet lending, invoicing, and supply chain finance)".

Stefan, Stremerscha and Gerard, J. Tellisc (2004) have tested the differences in pattern of growth in sales of products and found that the pattern of growth differs substantially across European countries. However, these differences are explained mostly by economic wealth and not by culture. It means growth in businesses is directly attached with the

economic growth which is not affected by the culture. So, use of information technology itself is not a factor to create a market of products, however, it can affect the sales revenue by creating awareness, facilitation in delivery and payments. However, its main effect will come from the economic growth. The use of financial technology can improve GDP growth and investment by improving informational efficiency and credit enhancement.

Various studies have explained the role of monetary policies and domestic credit in determination of investment and GDP growth. Economic theories have established a broad relation between money supply, investment and economic growth. Keynes (1936) and Hicks (1967) have explained the relation between economic growth and investment in macroeconomic context. Dimand (1988) and Gordon (1990) have provided the models to quantify the impacts of investment and interest rates. Recent economic literature covers various dimensions of these relations. Impacts of working capital on infrastructure development, provision of working capital for long term investment, debt-equity trade off and the banks credit to private sector for success of public-private partnership model are the areas which have been discussed in recent past. Stein (1982), Juan (2015), Mehar (2018) and Kindleberger (1970) have explained the role of credit financing and monetary policies in economic growth. Inderst (2018) have identified the role of financing to private sector for infrastructure development. Mehar (2005) had provided a model to test the role of credit financing as a substitute of equity.

In establishing relations among borrowing, interest rates and use of financial technology, Guizhou and Kjell (2022) found that central banks choose negative interest rates when they realize that the households are willing to pay the central banks for holding Central Banks Digital Currencies (CBDCs). Gormez (2019) claims that central banks that have perfectly addressed all the fundamental glitches of money and financial service provision can issue digital currencies with no reluctance. He mentioned that electronic money is not a new concept, and technology can enhance the way of dealing, but does not change the fundamental nature.

Christian and Hornuf (2019) have concluded that more fintech startup formations are possible when the economy is well developed and venture capital is readily available. Stijn, Frost, Turner and Zhu (2018) mentioned that fintech credit deals a substitute funding source for businesses and consumers and may expand access to credit for underserved fragments. It may improve the efficiency of financial intermediation. However, fintech credit sizes are greater in countries with less rigorous banking regulation. Zhong and Ruihui (2019) has explained how the government of China has implemented many regulations for fintech applications for the prevention and resolution of financial risks. They included P2P lending, third-party payment, and crypto-assets in those measures, while some additional measures including financial standardization, fintech infrastructure development, and investor protection have also been strengthened to promote sustainable fintech development. The government has tried to strike a balance between encouraging fintech innovation and strengthening regulations.

Another important aspect of the revolution in information technology is that it has facilitated the commercial banks in creation of more money by use of digital money (or digital currency). Intangible digital money is accounted for and transferred through online systems. The spread of covid-19 has further supported the use of digital and electronic money. While, the central banks in this era encouraged the commercial banks to create more money by ease of credit restrictions. This aspect further clarifies that why this study is concerned to test the impacts of credit enhancement and use of electronic and digital payments on poverty and income distribution.

In considering the importance of information technology, it is noteworthy that majority of countries in 2019-20 have adopted the soft monetary policies to mitigate the adverse effects of Covid-19 on the economy and to protect the lower income groups. The lowering interest rate and expansion in the credit to private sector were are also component of the soft monetary policy. So, in our analysis, we have included domestic credit to private sector as a policy variable. Those soft monetary policies are closely associated with the use of financial technology including use of internet, e-money, digital currency and accounts in mobile phone banking. So, the role and effectiveness of the financial inclusion and technology to protect the lower income groups has become an important area of concern after Covid-19.

It is noteworthy that growing use of financial technology is closely associated with the supply and creation of money and credit to private sector. Velde (2002) and Michael, Amar and Ryland (2014) have examined the money creation process in the modern economies. Their works compare the fiat money with the gold standard and described the historical roots of the monetary systems. The money based on precious commodities (gold and silver) have intrinsic value. While, commodity-based representative money in the form of paper notes can be exchanged with precious commodities. The global monetary system in contemporary world is a fiat system, which is based on paper currencies and metal coins as legal tender which are guaranteed by a government and notified by the central bank of the country. It does not represent intrinsic value of money. This system is based on historical integration of sovereign issued coins, credit by banks to their customers, and a common governance of commercial banks through a central bank. This system is responsible to provide money in the economy to create equilibrium in the money market. It consists of the national treasury, the central bank, the mint, and commercial banks. The volume of currencies in this system is derived through data of bank balances, records of credit or debit card

purchases, and relatively a small fraction in the forms of notes and coins issued by the central bank (Michael, Amar and Ryland: 2014). It corroborates that money is mainly created by commercial banks when they provide credit to their customers. Almost every country during the covid-19 crisis has used the enhancement of credit to private sector as a policy to protect the economic activities particularly lower income groups. To encourage the use of internet and e-money for monetary transaction is used as policy tools for this purpose.

It is notable that use of financial technology, internet and mobile banking are the important ingredients of financial inclusion, while financial inclusion, use of digital currency and e-money are also interrelated subjects. The use of digital currency and e-money is directly linked with the use of information technology and financial literacy. E-money is a digital alternative to cash, which allows its holder to make cashless payments via money stored on a phone, prepaid card, or online account. Electronic money (e-money) is broadly defined as an electronic store of monetary value on a technical device that may be widely used for making payments to entities other than the e-money issuer. The device acts as a prepaid bearer instrument which does not necessarily involve bank accounts in transactions. Electronic currency, electronic money, or digital money is managed, stored or exchanged on digital computer systems, especially over the internet. While, Electronic Money Institutions (EMI) are authorized to issue and manage e-money on behalf of its users. EMIs are not banks because they don't create money by their lending mechanism. EMIs offer contactless payment instruments like wallets and prepaid cards etc. The cost effectiveness and user-friendly properties of these instruments lead to innovations and technological advancement in EMIs. The best example electronic wallet is the mobile money service, which available allows users to store, send, and receive money using their mobile phone. While debit and credit cards are form of digital money.

To recognize a mode of payment as money it is the basic requirement that it must be acceptable commonly as a medium of exchange. However, a common question in the public mind is the power of a digital currency or e-money for its ability to store the value. In this respect two things are important: (1) value of a currency is determined by the peoples based on its demand and supply. The demand and supply of a currency is attached with the economic fundamentals of the country of issuer of a currency. (2) It is an important requirement to maintain the value and trustworthiness of currency that its copy should not be possible. This second objective relates the e-currency with the concept of 'crypto currency'. The idea behind these crypto currencies is to introduce those currencies which are globally acceptable. At present, more than 10000 crypto currencies dominated by Bitcoin are adopted by selected investors in different countries. The block chain technique which records uses of data in multiple ledgers are used in issuance of crypto currencies. The market size of these crypto currencies was recorded at 1.6 billion USD in 2021. The difference between crypto and digital currencies is only that digital currency is issued by a central bank. So, its record is maintained by the central banks of a country. Though, currency issued by a central bank is a fractional part of total money supply in the contemporary world; the bigger part of money supply is derived from the deposits of commercial banks. Even commercial banks in few countries are authorized to issue their currencies. So far as common acceptability of e-money is considered, it is also related with the financial literacy. History of money is evident that every type of currency was rejected by the peoples at its initial stage but with the passage of time every currency has got common acceptability by its users. This was an historical fact from gold coins to paper money. The plastic money was not exempted from this common principle, and now digital currencies and e-money are passing through this stage of acceptability. Earlier acceptance of changes in the system of monetary transactions can be beneficial for the poor families. But financial illiteracy is the man hindrance in financial inclusion of the poor families. So, they take more time to get the benefits of the changes. Consequently, it leads further widening in rich-poor gap.

The next section presents a global comparison of financial inclusion, use of financial technology, credit to private sector, GDP growth and poverty. After a brief review of this comparison, the section: 4 will provide a detailed statistical analysis and empirical investigation to assess the role of financial inclusion and information technology in determination of poverty, income distribution and unemployment.

3. Financial Inclusion, Credit to Private Sector and Poverty: Global Comparison

A significant change can be observed in the global pattern of GDP growth. The share of high-income countries in world GDP has dropped at 62 percent in 2021 from 72 percent in 2009. In 2009, the lowest per capita income was in South Asia but a significant continuous improvement has been observed in South Asia mainly in India. The share of South Asia in world GDP was 2.8 percent in 2009, now it is 4.2 percent.

The astonishing fact about South Asian countries belong to the level of poverty in this region. Despite lower rate of unemployment as compare to the rest of world (Table:2), the level of poverty is much higher in South Asia. A disassociation of a higher-level employment and magnitude of poverty may reflect the lower rates of wages and salaries in South Asia. It may reflect a higher dependency ratio in the region. In this situation, the contribution of financial sector become more important. The lending institutions can play their role to providing financing to startups and creation of new business entities. It is noteworthy that as compare to the

rest of world, the labor participation rate is much lower in South Asia, A lower labor participation rate with lower rate of unemployment indicates a large part of population is idle and even do not have interest to do work. This situation in South Asian context is surprising. This fact is confirmed by the registration of new business entities. Table: 3 shows that registration of new businesses is extremely low in South Asia as compare to the rest of the world. Obviously, it is an indicator that a big part of population is not able (or not interested) to establish their own businesses and they have to rely on employment opportunities in public or private sector enterprises. The more surprising aspect of this discussion is the lower proportionate of population using internet. The use of information technology including internet and mobile phone has become extremely important in contemporary business activities. It is envisaged in table: 4 that in 2020, less than 39 percent individual can use internet in South Asia. This ratio is 90 percent in high income countries, 80 percent in Europe and Central Asia (excluding high income countries) and 74 percent in Middle East in North America. The internet users in South Asia are less than World average (60 percent) and even less than middle income countries (57 percent). The share of population who have their accounts at a financial institution or with a mobile money service provide is also lower in South Asia. It is lower than world average and even lower than East Asia and Pacific.

Table: 2 envisages the dramatic decline in poverty headcount ratio in South Asia which is associated with the growth of per capita income. The accelerated enhancement in Gross Domestic Product (GDP) in South Asia is attributed mainly to India. However, no reasonable growth in GDP is observed in heavily indebted poor or low-income countries. The interest rate spread is inversely proportionated with the economic ranking of the countries based on their GDP. The interest rate spread is much higher in heavily indebted poor and low-income countries, while it is lower in high income countries. It is quite obvious that financial intermediary institutions in lower and middle-income countries earn more income on their services, so cost of debt is much higher in these countries as compare to the return on savings. Table: 4 shows also another important phenomenon that domestic credit to private sector as percentage of GDP is much lower in low and middle- income countries as compared to high income countries. This ratio is more than 100% in high income countries, while it is 70% in middle-income countries, and less than 50 percent in South Asia and other countries in 2009. In South Asia it was 44% which is lower than middle income countries average. It is envisaged in table: 4 that domestic credit to private sector is highly associated with the interest rate spread.

Table: 4 shows the trends of financing to private sector through domestic credit. The world average of domestic credit to private sector as percentage of GDP is almost 50 percent higher than domestic credit to private sector from banks as percentage of GDP. The total domestic credit to private sector in high income countries is almost twice of the domestic credit to private sector from banks. The position is same in East Asian and Pacific countries. But in rest of the world, total credit to private sector is slightly higher than their domestic credit to private sector from banks. Its mean that in higher income countries, non-banking financial sector plays an important role in providing the domestic credit to private sector. However, in the rest of world, private sector has to rely on banking sector for financing its activities through domestic credit. This table shows a consistency in the global patterns of domestic credit to private sector. The supply of credit to private sector from non-banking financial sector in high income countries and the countries in East Asia & Pacific region plays a significant role in business activities.

Domestic credit as percentage of GDP is much higher in high income countries and East Asian & Pacific countries which is more than 100 percent of their GDP but it is much lower in other countries, particularly in the countries in West and Central Africa. The magnitude of domestic credit to private sector is extremely low n West and Central Africa despite the lower interest rate spread in this region. In Asia, the position of South Asia is not comparable with East Asia and Pacific. However, a dramatic growth in the magnitude of domestic credit has been observed after covid-19 crisis.

'Domestic credit to private sector' (DCPS) refers to financial resources provided to the private sector. It covers loans, purchases of nonequity securities, and trade credits and other accounts receivable. For some countries, credit to public enterprises is also included in this definition. While, 'Domestic credit to private sector by banks' (DCPSB) refers to financial resources provided to the private sector by depository taking corporations (except central banks). It is a sub-set of monetary sector credit (DCPSM), which includes short-term securities issued by monetary authorities to the private sector. 'Domestic credit provided by the financial sector' (DCPSF) includes all credit to various sectors on a gross basis (except credit to the central government). The financial sector includes monetary authorities and deposit money banks, as well as other financial corporations (including corporations that do not accept transferable deposits but do incur such liabilities as time and savings deposits). Examples of other financial corporations are finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange companies.

Table 1. Patterns of GDP growth

Region/ Group	Share in World GDP (%)	GDP growth (annual %)	GDP per capita (USD)	GDP per capita growth (annual %)
2009 (World GDP: 60809 billion USD)				
Africa Eastern and Southern	1.18	0.76	1425.31	-1.92
Africa Western and Central	0.83	6.27	1486.71	3.38
South Asia	2.77	6.93	1041.98	5.37
Middle East & North Africa[#]	2.25	2.64	4191.91	0.84
Latin America & Caribbean[#]	5.93	-2.08	6863.89	-3.20
Europe & Central Asia[#]	4.01	-5.73	6489.46	-6.18
East Asia & Pacific[#]	10.66	7.98	3321.97	7.21
High income	71.81	-3.23	37307.33	-3.92
Middle income	26.77	3.20	3174.72	2.00
World	100.00	-1.33	8890.80	-2.52
2018 (World GDP: 86413 billion USD)				
Africa Eastern and Southern	1.15	2.49	1541.03	-0.18
Africa Western and Central	0.86	2.95	1704.14	0.24
South Asia	4.08	6.37	1944.01	5.11
Middle East & North Africa[#]	1.60	1.66	3604.93	-0.03
Latin America & Caribbean[#]	5.60	1.63	8357.12	0.54
Europe & Central Asia[#]	3.68	3.15	8008.26	2.59
East Asia & Pacific[#]	19.26	6.52	7954.76	5.82
High income	63.43	2.34	44571.43	1.87
Middle income	35.69	4.91	5415.61	3.78
World	100.00	3.28	11366.07	2.14
2021 (World GDP: 96100 billion USD)				
Africa Eastern and Southern	1.13	4.30	1557.72	1.69
Africa Western and Central	0.87	3.91	1774.92	1.25
South Asia	4.25	8.32	2176.78	7.11
Middle East & North Africa[#]	1.52	4.22	3612.25	2.44
Latin America & Caribbean[#]	4.79	6.43	7727.16	5.49
Europe & Central Asia[#]	3.64	6.90	8708.06	6.65
East Asia & Pacific[#]	21.59	7.27	9776.49	6.86
High income	61.86	5.11	47886.78	5.05
Middle income	37.24	6.95	6102.00	5.98
World	100.00	5.80	12262.93	4.82

Excluding high income countries

Table 2. Unemployment and poverty

Region/ Group	Labor Force Participation (% of Population ages 15+)	Unemployment (% of Total Labor Force)		Poverty Headcount Ratio (% of Population) based on 2017 PPP at:	
	National Estimate	National Estimate	ILO estimate	USD 2.15 per day	USD 3.65 per day
2009					
Africa Eastern and Southern			6.32		
Africa Western and Central			4.58		
South Asia			5.01	29.40	68.50
Middle East & North Africa[#]	43.27	10.54	10.51		
Latin America & Caribbean[#]	65.17	7.64	7.37		
Europe & Central Asia[#]	61.70	9.13	9.13		
East Asia & Pacific[#]	71.33	4.22	4.39		
High income	60.90	8.05	7.94	0.50	0.90
Middle income		5.62	5.60		
World	64.50	6.27	6.01	17.90	38.50
2018					
Africa Eastern and Southern			6.73		
Africa Western and Central	67.88*	6.98*	6.04		
South Asia	48.40	5.16	5.12	10.00	45.60
Middle East & North Africa[#]	43.20*		11.62		
Latin America & Caribbean[#]	63.96	7.96	8.05		
Europe & Central Asia[#]	61.69	7.30	7.08		
East Asia & Pacific[#]		3.50	3.79		
High income	60.93	5.11	5.07	0.60	0.80
Middle income		5.23	5.50		
World		5.19	5.39	8.90	24.70
2021					

Africa Eastern and Southern			8.11		
Africa Western and Central			6.84		
South Asia	50.90**	4.83**	5.79		
Middle East & North Africa#			12.19		
Latin America & Caribbean #	62.16	9.71	10.12		
Europe & Central Asia#	58.04**	7.65**	7.76		
East Asia & Pacific#			4.29		
High income	60.18	5.74	5.67		
Middle income			6.32		
World			6.18		
# Excluding high income countries; * data for 2017; ** data for 2020;					

Table 3. Use of information technology and business environment

Region/ Group	New Business Registered (per 1000 peoples ages 15-64)	Ease of Doing Business Scores (0 for lowest to 100 for best)	Transparency, Accountability & Corruption in Public Sector Rating (1= for low to 6 for high)	Individuals Using the Internet (% of Population)	Account Ownership at a Financial Institution or with a Mobile Money Service Provider	
					% of population ages 15+	% of poorest 40% population ages 15+
2009						
Africa Eastern and Southern			2.61	3.22		
Africa Western and Central			2.83	5.81		
South Asia	0.09		3.06	5.12		
Middle East & North Africa#			2.75	17.87		
Latin America & Caribbean#	1.67		3.50	30.35		
Europe & Central Asia#	1.73		2.61	32.07		
East Asia & Pacific#			2.95	23.79		
High income				69.46		
Middle income			3.02	17.78		
World			2.87	25.67		
2018						
Africa Eastern and Southern	0.74	52.92	2.50	21.70		
Africa Western and Central	0.65	48.43	2.90	29.34		
South Asia	0.15	56.29	2.92	19.84	69.46*	65.54*
Middle East & North Africa#		52.91	2.00	55.53	43.42*	35.27*
Latin America & Caribbean#	1.55	59.10	3.44	64.70	54.41*	41.96*
Europe & Central Asia#	2.42	72.10	2.60	72.68	65.14*	56.23*
East Asia & Pacific#	7.11	59.34	3.04	55.74	70.37*	60.28*
High income	4.61	73.90		87.13	93.17*	89.99*
Middle income	3.14	60.09	3.05	44.48	64.86*	56.59*
World	3.17	62.23	2.84	49.40	68.50*	60.89*
2021						
Africa Eastern and Southern			2.47			
Africa Western and Central	0.79**		2.90	34.13**		
South Asia	0.17**		3.20	38.56**	67.89	64.48
Middle East & North Africa#			2.25	73.63**	48.09	41.26
Latin America & Caribbean#	2.06**		3.25	73.20**	72.95	67.14
Europe & Central Asia#	2.22**		2.88	80.19**	77.79	71.64
East Asia & Pacific#	7.19**		3.11	66.59**	80.70	74.72
High income				89.55**	93.36	94.41
Middle income	3.40**		3.13	57.26**	72.37	67.68
World	3.53**		2.87	59.94**	76.20	71.91
# Excluding high income countries; * data for 2017; **data for 2020;						

Table 4. Credit to private sector as % of GDP and interest rate spread

Region/ Group	Domestic credit	Monetary Sector credit	Domestic credit by banks	Interest rate spread (%)
2009				
Africa Eastern and Southern	79.25	42.10	42.06	8.12
Africa Western and Central	16.64	16.64	16.59	-3.60
South Asia	44.11	44.10	44.08	5.86
Middle East & North Africa#	33.27	34.92	34.81	5.48
Latin America & Caribbean#	34.73	33.43	33.42	8.15
Europe & Central Asia#	45.31	43.37	43.32	6.31
East Asia & Pacific#	111.20	110.16	110.12	5.52
High income	147.84	92.53	92.42	
Middle income	69.89	67.24	67.21	6.52
World	124.82	84.54	84.46	5.93
2018				
Africa Eastern and Southern	65.29	38.21	38.02	9.12
Africa Western and Central	13.59	13.59	13.44	
South Asia	45.97	45.97	45.94	3.31
Middle East & North Africa#		29.10	29.08	
Latin America & Caribbean#	48.90	46.45	46.44	7.12
Europe & Central Asia#	51.31	49.58	49.56	5.06
East Asia & Pacific#	144.88	143.51	143.50	4.80
High income	140.20	81.86	81.46	
Middle income	101.79	99.54	99.53	6.09
World	125.59	88.13	87.87	5.34
2020				
Africa Eastern and Southern	59.74	38.63	38.34	8.13
Africa Western and Central	14.74	14.74	14.05	
South Asia	49.49	49.48	49.46	5.58
Middle East & North Africa#	35.76	34.05	34.02	
Latin America & Caribbean#	54.66	51.75	51.74	6.55
Europe & Central Asia#	57.54	55.65	55.63	4.34
East Asia & Pacific#	167.34	166.00	165.99	4.90
High income	164.18	87.95	87.46	
Middle income	120.26	118.10	118.07	5.73
World	147.36	98.90	98.58	
# Excluding high income countries				

Table 5. List of variables and sources of data

Abbreviation	Definition	Source
30BNK	Loan from a bank, employer, or private lender is the main source of emergency funds in 30 days (% of peoples age 15+)	Global Findex database; World Bank (2022)
30PSBL	Possibility without any difficulty to arrange emergency funds in 30 days (% of peoples age 15+)	Global Findex database; World Bank (2022)
30PSBL40	Possibility without any difficulty to arrange emergency funds in 30 days (% of poorest 40% peoples age 15+)	Global Findex database; World Bank (2022)
CRCRD	Credit card users (% of peoples age 15+)	Global Financial Development; World Bank (2022)
CRDTDPS	Bank credit to bank deposits (%)	Global Financial Development; World Bank (2022)
CRPTN	Transparency, Accountability & Corruption in Public Sector Index (in units of a standard normal distribution, ranging from approximately -2.5 to 2.5)	Worldwide Governance Indicator; World Bank (2022)
DBUS	New business density (new registrations per 1,000 people ages 15-64)	World Development Indicators; World Bank (2022)
DCPS	Domestic credit to private sector (% of GDP)	World Development Indicators; World Bank (2022)
DCPSB	Domestic credit to private sector by banks (% of GDP)	World Development Indicators; World Bank (2022)
DCPSF	Domestic credit (both private and public sectors) provided by financial sector (% of GDP)	World Development Indicators; World Bank (2022)
DCPSF1	Private credit by banks and other financial institutions to GDP (%)	Global Financial Development; World Bank (2022)
EASE	Ease of doing business score (0 for lowest to 100 for best)	Doing Business Indicators; World Bank (2021)
EFCTV	Government Effectiveness Index (in units of a standard normal	Worldwide Governance Indicator;

	distribution, ranging from approximately -2.5 to 2.5)	World Bank (2022)
ELCPMT	Electronic payments used to make payments (% of peoples age 15+)	Global Financial Development; World Bank (2022)
FINTCBIG	Credit flows by fintech and big tech companies as percentage of GDP	Global Financial Development; World Bank (2022)
FOOD	Food production index (2014-2016 = 100)	World Development Indicators; World Bank (2022)
GDP	GDP (current USD)	World Development Indicators; World Bank (2022)
GINI	Gini index (for income inequality)	World Development Indicators; World Bank (2022)
GROW	GDP growth (annual %)	World Development Indicators; World Bank (2022)
INTRNT	Individuals using the Internet (% of population)	World Development Indicators; World Bank (2022)
LABR	Labor force participation rate (% of total population ages 15-64)	World Development Indicators; World Bank (2022)
LWST20	Income share held by lowest 20%	World Development Indicators; World Bank (2022)
MBLPMT	Mobile phone used to pay bills (% of peoples age 15+)	Global Financial Development; World Bank (2022)
NPL	Bank non-performing loans to gross loans (%)	Global Financial Development; World Bank (2022)
PCIGROW	GDP per capita growth (annual %)	World Development Indicators (2022); World Bank (2022)
PVRTY	Poverty headcount ratio at national poverty lines (% of population)	World Development Indicators;
		World Bank (2022)
SPRED	Difference between average lending and deposit rates of interest	Global Financial Development; World Bank (2022)
TXTPRFT	Total tax and contribution rate (% of profit)	Doing Business Indicators; World Bank (2021)
UNEMPL	Unemployment (% of total labor force)	World Development Indicators; World Bank (2022)
WORYMD	Paying for medical costs in case of a serious illness or accident is the most worrying financial issue (% of peoples age 15+)	Global Findex database; World Bank (2022)

Table 6. List of variables and sources of data

Variable	Mean	Median	Standard Deviation	Minimum	Maximum
30PSBL	30.68	24.75	19.64	3.45	83.44
30PSBL40	20.17	13.15	17.38	1.32	73.63
30BNK	7.79	7.22	4.81	0.81	28.23
WORYMD	32.20	31.24	12.91	3.11	66.41
ELCPMT	59.05	59.14	29.32	3.53	99.93
CRCRD	21.47	12.90	22.41	0.00	82.74
GROW	5.37	4.63	5.08	-17.98	31.37
CRDTDPS	90.02	77.98	61.90	18.13	535.71
DCPSF1	58.14	50.21	43.42	6.62	193.96
PCIGROW	4.27	3.97	5.41	-18.58	30.22
CRPTN	-0.12	-0.36	1.02	-1.82	2.37
EFCTV	-0.05	-0.13	1.02	-2.38	2.29
UNEMPL	8.17	6.34	5.92	0.26	33.56

Figure 1. Effects of information and communication technology on poverty (Simultaneity in the Model)

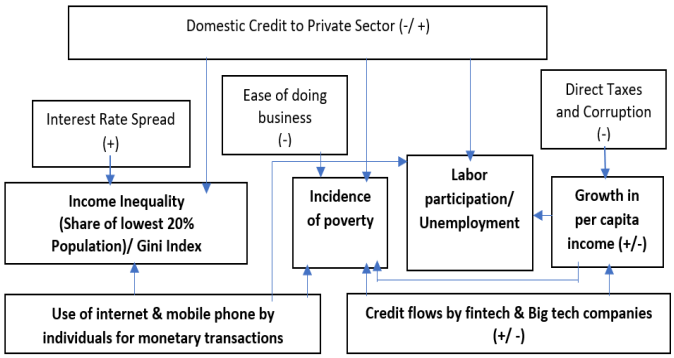
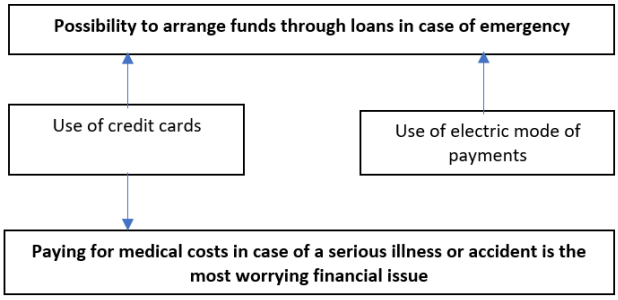


Figure 2. Financial technology in case of emergencies



4. Methodology: Role of Financial Technology and Domestic Credit

Table 4 shows a picture of the credit to private sector and compares the different regions and groups, while table 3 shows the financial inclusion and use of financial technology in economic transactions. The causes and justifications of changes in the trends of credit to private sector, interest rates, poverty and income distribution in recent past have been explained in economic literature (World Bank: 2020a, IMF: 2020a, IMF: 2020b, Krugman: 2020, Rogoff: 2020, Mehar: 2021, Marlene, Huang, Morgan, and Shirai: 2019, Gormez: 2019, Durrani, Rosmin, and Volz: 2020, Sachs at el: 2020, and University of Cambridge: 2020). Based on their justifications and economic theories in the literature, we have established the statistical models to express the relations between poverty, unemployment, economic, credit to private sector and the use of information technology.

We have attempted to assess the role of various components financial technology in alleviation of poverty, income inequality and unemployment with the help of empirical evidences. The domestic credit has been included in the study as a control variable to quantify the net effect of information technology on poverty and income distribution. We hypothesized that growing use of financial technology and enhancement in domestic credit alleviate poverty and unemployment. However, it is notable that enhancement in credit to private sector can destroy the monetary system by several ways. For instance, the excessive supply of money can accelerate inflation in the commodity market. It may be a cause of unintended increase in real estates or industrial assets prices. The positive association between the magnitude of credit to private sector and non-performing loans is another aspect of the credit enhancement policy. In this situation, domestic credit to private sector will not be an effective tool for growth and poverty alleviation. In this respect, Nguyen (2022) and Paresh and Solikin (2022) have emphasized prudential regulations and stability of banking sector for effectiveness and performance of credit enhancement policies.

Based on the above-mentioned hypothesis and current observations in global economic trends (table:1 to 4), we have established an econometric model based on 8 simultaneous equations. Specifically, we are interested to identify the role of financial technology and domestic credit in alleviation of poverty. The domestic credit to private sector and the use of financial technology for monetary transactions have been applied as explanatory variables in this study. The relations between poverty and explanatory variables can be expressed in the following equation:

$$PVRTY_{it} = \beta INTRNT_{it} + \gamma DCPS_{it} + \delta X_{it} + \mu_i + \tau_t + \epsilon_{it}$$

Where 'PVRTYit' is the poverty headcount ratio as percentage of total population in a country i for year t; 'INTRNTit' and 'DCPSit' are vectors of variables related to 'individuals using the internet as percentage of population, and 'domestic credit to private sector'; 'Xit' is a vector of exogenous control variables; 'μi' denotes unobserved time-invariant heterogeneity at the country level; 'τt' is a time-fixed effect; and 'εijt' is an independent disturbance term.

The theoretical framework which constitutes the relations between the use of internet, poverty, income inequality, domestic credit to private sector, ease of doing business, interest rate spread and non-performing loans can be described as follows:

$$PVRTY_{it} = f\,(INTRNT_{it,}\, DCPS_{it},\, EASE_{it})$$
$$GINI_{it} = f\,(INTRNT_{it,}\, SPRED_{it},\, NPL_{it})$$

Where 'GINI' is Gin-index to measure the income inequality, 'SPRED' is the difference between lending and borrowing interest rates, 'EASE' is index to measure the ease of doing business and 'NPL' is the non-performing loans as percentage of total loans. Relating the poverty headcount ration to the aforementioned factor, the estimated both direct and indirect effects can be expressed as follows:

$$\frac{dPVRTY}{dFINTCBIG} = \frac{\partial PVRTY}{\partial FINTCBIG} + \frac{\partial PVRTY}{\partial PCIGROW}.\frac{\partial PCIGROW}{\partial FINTCBIG} + \frac{\partial PVRTY}{\partial INTRNT} + \frac{\partial PVRTY}{\partial DCPS} + \frac{\partial PVRTY}{\partial EASE}$$

We have incorporated the impacts of credit flows by fintech and big tech companies as percentage of GDP (FINTCBIG), individuals using the internet, (INTRNET) and use of mobile phone to pay bills (MBLPMT) as explanatory factors of poverty headcount ratio (PVRTY), Gini index (GINI) and share of lowest 20 percent population in income (LWST20).

We supposed that flow of funds through fintech and big technology companies (FINTCBIG), use of internet by large number of individuals (INTRNT), domestic credit to private sector (DCPS) and ease of doing business (EASE) will alleviate the poverty headcount ratio (PVRTY) in a country. In the light of this supposition, we established the fowling 6 equations. The basic idea to establish these equations is to test the impacts of the use of financial technology on poverty, income distribution and growth in per capita income.

We have also tested the impacts of using the digital modes of financing (credit cards and internet) on the perception of an individual about his position to deal with financial emergencies. For this purpose, we estimated 2 equations. In equation 7, we determined the individual perception about possibility of borrowing from banks or financial institutions within 30 days in case of medical emergency or critical illness or accident (30PSBL). We supposed that use of financial technology will assist the individual to arrange the funds in such conditions. In equation 8, we determined the individual perception that most worrying financial issue is the arrangement of funds for payment of medical bills (WORMD). These last two equations have been estimated for lowest 40 percent income group separately. All equations have been estimated by different alternative options (models). Several control variables to estimate the net effect of the various components of financial technology and domestic credit have been included in the estimations. The model can be expressed in the following 8 equations:

$$PVRTY_{it} = \propto_i + \beta_1 FINTCBIG_{it} + \beta_2 INTRNT_{it} + \beta_3 DCPS_{it} + \beta_4 EASE_{it} + \beta_5 PCIGROW_{it} + \varepsilon_{it} \quad (1)$$

$$GINI_{it} = \propto_i + \beta_1 INTRNT_{it} + \beta_2 SPRED_{it} + \beta_3 NPL_{it} + \beta_4 DBUS_{it} + \varepsilon_{it} \quad (2)$$

$$LWST20_{it} = \propto_i + \beta_1 INTRNT_{it} + \beta_2 SPRED_{it} + \beta_3 NPL_{it} + \beta_4 DBUS_{it} + \varepsilon_{it} \quad (3)$$

$$LABR_{it} = \propto_i + \beta_1 INTRNT_{it} + \beta_2 DCPS_{it} + \beta_3 DBUS_{it} + \varepsilon_{it} \quad (4)$$

$$UNEMPL_{it} = \propto_i + \beta_1 INTRNT_{it} + \beta_2 DCPS_{it} + \beta_3 DBUS_{it} + \beta_4 GROW_{it} + \varepsilon_{it} \quad (5)$$

$$PCIGROW_{it} = \propto_i + \beta_1 FINTCBIG_{it} + \beta_2 TXTPRFT_{it} + \beta_3 CRPTN_{it} + \varepsilon_{it} \quad (6)$$

$$30PSBL_{it} = \propto_i + \beta_1 ELCPMT_{it} + \beta_2 CRCRD_{it} + \beta_3 CRDTDPS_{it} + \beta_4 GROW_{it} + \varepsilon_{it} \quad (7)$$

$$WORYMD_{it} = \propto_i + \beta_1 ELCPMT_{it} + \beta_2 CRCRD_{it} + \beta_3 CRDTDPS_{it} + \beta_4 GROW_{it} + \varepsilon_{it} \quad (8)$$

The simultaneity in the above equations has been shown in figures 1 and 2. To test the impact of information technology and domestic credit, we hypothesized that use of information technology (FINTECBIG, MBLPMT, ELCPMT, INTRNT) and domestic credit to private sector (DCPS) are the major determinants of poverty headcount ration (PVRTY), income inequality (GINI), share of lowest 40 percent population in income (LWST20), labor participation rate (LABR), and unemployment rate (UNEMPL). While, the number of new business entities (DBUS), ease of doing business index (EASE), corruption index (CRPTN), tax on profits (TXTPRFT) and interest rate spread (SPRED) have been taken as control variables. Growth in GDP is also an important determinant of poverty, employment and income inequality. It has been taken as explanatory variable, while the factors of per capita GDP growth have been estimated in equation: 6.

We used pooled data of 148 countries for 14 years (from 2008 to 2021). The Panel (unbalanced) Least Square (PLS) technique was applied to estimate the effects of explanatory variables. The data of other countries could not be included in the model because unavailability of data on some indicators which have been included in the analysis. The data for these variables have been extracted from different sources (World Bank: 2021 and World Bank: 2022). The description of variables and sources are described in table: 5. However, equation 7 and 8 have been estimated on cross section data for year 2021. The data for the variables in these equations was extracted through individuals and households survey (World Bank: 2021).

The above-mentioned models have been estimated through regression analysis. All the equations have been estimated in 5 alternative scenarios (options). The objective of the estimations by alternative options by adding more control variables is to check the robustness of parameters. The impacts of explanatory variables have been quantified by the 'βs' associated with these variables, while 'T-statistics' show the level of significance of these 'βs'. The significances of models as whole have been checked through adjusted 'R-squares' and their associated 'F-statistics'. All these statistical parameters have been reported in table 7 to 14.

5. Results and Empirical Findings

The results of regression analysis have been presented in tables 7 to 14. The significance of parameters and overall goodness of fit in the equations have also been reported in the above-mentioned tables. The parameters associated with the betas show quantifications of the impacts of explanatory variables, however some results are surprising and against the

common views. The adjusted R-squares and F-statistics show goodness of fit in all estimated equations, which indicate that explanatory variables included in the models significantly cover the sufficient effects.

The robustness in estimated parameters have also been checked by using the alternatives options. To conduct some falsification tests, some control variables have also been included in the regression analysis.

Table 7 shows that use of internet (INTRNT) and flow of funds through fintech companies (FINTCBIG) alleviate poverty headcount ratio (PVRTY). The use of internet (INTRNT) and mobile payments (MBLPMT) cannot be used simultaneously because of multicollinearity in these two variables. The negative effects of internet (INTRNT) and flow of funds through fintech and big technology companies (FINTCBIG) on poverty headcount ratio are significant and robust in all alternative options. Similarly, the impact of ease of doing business (EASE) and domestic credit to private sector (DCPS) are also significant. The role of these variables is effective in alleviation of poverty.

Table 8 and 9 shows some important conclusion regarding the role of internet (INTRNT) and interest rate spread (SPRED). The more use of internet (INTRNT) improves the share of lower income group in total income (LWST20) and reduce the income inequality (Gini-index). Similarly, the higher interest rate spread (SPRED) leads to more income inequality. These results are consistent in equation 8 and 9. These findings are significant and robust in all alternative scenarios. Though, it is commonly urged by analysts that raising asset prices, near-zero interest rates and quantitative easing in monetary policy contribute in growing inequality, while practitioners of central banking, counter that the distributional impact have been either neutral or even egalitarian due to its employment impacts. Juan and Gerald (2015) have concluded that QE modestly dis-equalizes despite its positive impacts on employment and mortgage refinancing. Their analysis has not supported the proposition that raising interest rates would be an efficient mechanism for improving income distribution. Instead of the magnitudes of interest rates for lending and borrowing, our analysis emphasizes on the reduction in interest rate spread.

The research is mainly belonged to test the impacts of credit to private sector and use of financial technology on poverty and income distribution. The results of this research confirm the effectiveness of the use of information technology and credit to private sector.

The similar conclusions are derived for the use of internet. The growing use of internet alleviate the poverty. The domestic credit to private sector (DCPS) and ease of doing business (EASE) are also effective measures of the poverty alleviation. Higher rate of per capita GDP growth (PCIGROW) plays also a significant role in poverty alleviation, which support the trickle-down theory. However, growing number of new entities for per thousand peoples (DBUS) leads to poverty. This result is surprising but may be interpreted as an offshoot of the economies of scale. The small number of big business entities are better than the large number of small entities. The small entities do not provide handsome packages to their workers and don't have competitive prices of their products because they don't have economies of scale. So, divergence of workers into small entities may aggravate the level of poverty.

The impact of the use of information and communication technology on income inequality has been tested by two different ways. First, we tested the impact of the use of internet (INTRNT) and payments through mobile phone (MBLPMT) on Gini Index. (GINI). A higher Gini coefficient is an indicator of greater income inequality, which shows that higher income individuals are receiving much larger percentage of the population's total income. It was observed that impact of interest rate spread (SPRED) on Gini coefficient (GINI) is positive while non-performing loans affect the Gini coefficient negatively. These results are statistically significant and robust in all alternative options. These results reveal some important conclusions. The results indicates that higher interest rate spread (difference between lending and deposits rates of interests) is one of the major causes of income inequality in a country. Obviously, the role of monetary policy become more important to rectify this situation. The surprising negative impact of non-performing loans (NPL) on income inequality (GINI) may be an indicator of the pressure on banking system to write off those loans which can damage the economic conditions of individuals.

The most important result based on the empirical findings is the negative impact of the growing use of internet on income inequality (GINI). The magnitude of the beta attached with the use of internet has a negative sign, while estimated betas are statistically significant. These estimated parameters are robust in all alternative options. This finding is important from the policy formulation to promote the use of information and communication technology. The growing use of information and communication technology will reduce income inequality.

Another method to measure the inequality is the share of income held by lowest 20 percent population. The empirical evidences shows that share of lowest 20 percent population in national income can be improved by more use information and communication technology (INTRNT and MOBLPMT). The higher spread of interest rate (SPRED) reduces the share of lowest 20 percent income peoples. These results are also significant and robust. The effect of the domestic credit to private sector (DCPS) is positive but weakly significant. The positive impact of the non-performing loans (NPL) and negative impact of the number of new businesses per thousand peoples (DBUS) do not support the common opinions; their roles have been explained in above paragraphs.

In fact, the growing use of information technology promote the informational efficiency in all kinds of markets: commodity, labor financial and money markets. It is quite obvious that informational efficiency provides optimal opportunities for employment and utilizations of individual services. In this way more earnings opportunities may be available to the lower income peoples which can ultimately reduce the income inequality and poverty. Another result against the common intuitive is the positive association between growing income inequality and number of business entities in an economy (DBUS). It reflects that growing number of business entities will provide more earnings to the higher income individuals, while lower income individuals cannot establish their businesses. Though more business entities can provide employment opportunities to the lower income peoples but at the same time they widen the rich poor gap.

The results indicates that the use of information and communication technology (INTRNT and MBLPMT) improves the labor participation rate. These results are significant but both the indicators of information and communication technology (INTRNT and MBLPMT) cannot be used simultaneously because of multicollinearity in the data. The simultaneous use of both the independent variables does not show their effect. The number of new business entities (DBUS), domestic credit to private sector (DCPS and DCPSB) and ease of doing business (EASE) improves the labor participation rate significantly. However, the role of GDP growth (GROW and PCIGROW) and flow of credit by fintech and big tech companies (FINTCBIG) are not significant.

The role of internet in reduction of unemployment was also tested in the study. It has been noted that more use of internet (INTRNT) reduces the rate of unemployment. While, GDP growth (GROW) and domestic credit to private sector by banks, financial institutions and other sources (DCPS, DCPSB and DCPSF) are the strong and significant determinants of the employment. The growth in GDP and credit enhancement to private sector alleviate the unemployment. Again, it was noted the creation of more business entities for per thousand peoples create more unemployment. This result has been already interpreted in above paragraphs.

In determination of growth in per capita income (PCIGROW) and GDP growth (GROW), the flow of credit by fintech and big technology companies (FINTCBIG) is the most significant variable. It is evident that more flow of credit by fintech and big technology companies accelerates the per capita income significantly. It improves the rate of growth in per capita income. However, the use of electronic payment (ELCPMT) does not support the growth in per capita income. The taxes on profits (TXTPRFT) and corruption (CRPTN) are causes of declining in per capita income. The role of domestic credit to private sector (DCPS) and use of credit cards (CRCRD) affect the growth in per capita income (PCIGROW) negatively. Mehar (2021) has concluded the similar impact of domestic credit on GDP growth.

To capture the impacts of electronic payment (ELCPMT), use of credit cards (CRCRD) and credit to private sector by financial institutions (DCPSF1) on financial emergencies, we established two models. The estimations of these models are based on the survey data (World Bank: 2022b). The dependent variable in the first model is the percentage of peoples who perceive that they can arrange money within 30 days in case of financial emergencies. To capture their perceptions, we divided their responses in 3 categories: (1) peoples who perceive that they can easily arrange money within 30 days in case of financial emergencies, (2) Peoples who belong to lowest 40 percent income group and perceive that they can easily arrange money within 30 days in case of emergencies, and (3) peoples who can perceive that they can arrange money through bank borrowing within 30 days in case of emergencies. Table (13) shows the empirical findings. According to the statistical results the more use of electronic payment (ELCPMT) and credit cards (CRCRD) play a very positive and significant role in developing this perception. The more use of electronic payments (ELCPMT) and credit cards (CRCRD) improves the peoples' perception that they can arrange money during the crisis. The aggregate credit to deposit ratios in the banks also plays a positive role in developing this perception. Surprisingly, these three factors are not significant for arranging the money through banks financing in case of emergencies. The role of GDP growth is not clear. Similarly in determination of the peoples' perception that their top most financial problem is to arrange money in case of a medical emergency due to a critical disease or accident, availability of credit cards is the only significant variable. The more credit card holders in a country lead to lower percentage of peoples who are worried because of the fear of medical emergencies in future. This fear is not affected by GDP growth, employment or banks' credit to deposit ratio.

Table 7. Dependent Variable: Poverty Headcount Ratio at National Poverty Lines (PVRTY)

Method: Panel Least Square
Sample (adjusted): 2013-2019
Periods included: 7; Cross-sections included: 70
Total panel (unbalanced) observations: 235

Independent Variable/ Option	I	II	III	IV	V
Constant	69.15*** (14.83)		40.70*** (4.68)	55.00*** (10.61)	47.98*** (4.88)
FINTCBIG: Credit flows by fintech and big tech	-3.76*** (-3.25)	-4.10*** (-3.72)	-2.83** (-2.08)	-2.81** (-2.57)	-2.85** (-2.61)

companies as percentage of GDP					
INTRNT: Individuals using the Internet (% of population)		-0.17*** (-4.32)	-0.13** (-2.30)	-0.22*** (-5.67)	-0.22*** (-5.68)
EASE: Ease of doing business score (0 for lowest to 100 for best)	-0.64*** (-8.31)	-0.24** (-2.41)	-0.17 (-1.21)	-0.20** (-1.99)	-0.20** (-1.95)
DCPS: Domestic credit to private sector (% of GDP)		-0.05*** (-2.98)	-0.06** (-2.09)	-0.07*** (-4.64)	-0.07*** (-4.56)
DCPSB: Domestic credit to private sector by banks (% of GDP)	-0.08*** (-4.46)				
DBUS: New business density (new registrations per 1,000 people ages 15-64)	0.50*** (3.10)			0.65*** (4.41)	0.66*** (4.46)
PCIGROW: GDP per capita growth (annual %)				-1.48*** (-5.09)	-1.48*** (-5.08)
SPRED: Difference between average lending and deposit rates of interest			0.64* (1.94)		
FOOD: Food production index (2014-2016 = 100)					0.07 (0.84)
Adjusted R-squared	0.48	0.50	0.44	0.58	0.57
Akaike info criterion	7.11	7.11	7.47	6.92	6.93
Schwarz criterion	7.19	7.18	7.61	7.04	7.06
Hannan-Quinn criterion	7.14	7.14	7.53	6.97	6.98
F-statistic	49.34	58.58	17.93	47.81	41.02

Table 8. Dependent Variable: Gini Index for Income Inequality (GINI)

Method: Panel Least Squares
Sample (adjusted): 2008-2019
Periods included: 12; Cross-sections included: 62
Total panel (unbalanced) observations: 336

Independent Variable/ Option	**I**	**II**	**III**	**IV**	**V**
Constant	42.39*** (11.10)	47.22*** (21.71)	41.90*** (29.38)	42.00*** (30.13)	43.76*** (8.82)
INTRNT: Individuals using the Internet (% of population)	-0.08*** (-4.23)	-0.13*** (-4.45)	-0.08*** (-4.20)	-0.07*** (-3.83)	-0.13** (-2.78)
SPRED: Difference between average lending and deposit rates of interest	0.41*** (6.06)	0.55*** (6.31)	0.41*** (6.10)	0.40*** (6.09)	1.36** (2.24)
NPL: Bank non-performing loans to gross loans (%)	-0.56*** (-7.73)	-0.56*** (-3.12)	-0.56*** (-8.21)	-0.56*** (-8.10)	-0.15 (-0.33)
DBUS: New business density (new registrations per 1,000 people ages 15-64)	0.47*** (3.11)	0.29 (1.50)	0.44*** (2.98)	0.50*** (3.34)	0.42 (1.44)
DCPS: Domestic credit to private sector (% of GDP)	-0.01 (-0.86)	-0.03* (-1.67)	-0.01 (-1.06)		
DCPSB: Domestic credit to private sector by banks (% of GDP)				-0.02* (-1.90)	
DCPSF: Domestic credit (both private and public sectors) provided by financial sector (% of GDP)					-0.02 (-0.71)

PCIGROW: GDP per capita growth (annual %)			-0.08 (-0.71)	-0.09 (-0.80)	
FINTCBIG: Credit flows by fintech and big tech companies as percentage of GDP		-0.25 (-0.29)			-3.87 (-0.88)
LABR: Labor force participation rate (% of total population ages 15-64)	-0.01 (-0.23)				
Adjusted R-squared	0.28	0.36	0.28	0.27	0.33
Akaike info criterion	6.71	6.57	6.73	6.74	6.78
Schwarz criterion	6.79	6.72	6.81	6.81	7.04
Hannan-Quinn criterion	6.74	6.63	6.76	6.77	6.88
F-statistic	22.90	13.89	23.24	22.98	5.28

Table 9. Dependent Variable: Income Share held by Lowest 20% (LWST20)

Method: Panel Least Squares
Sample (adjusted): 2008-2020
Periods included: 13; Cross-sections included: 64
Total panel (unbalanced) observations: 361

Independent Variable/ Option	**I**	**II**	**III**	**IV**	**V**
Constant	6.65*** (20.14)	6.75*** (12.77)	6.48*** (11.91)	6.32*** (19.30)	6.72** (7.05)
INTRNT: Individuals using the Internet (% of population)	0.01* (1.76)		0.01* (1.78)	0.01 (1.29)	0.01 (1.38)
MBLPMT: Mobile phone used to pay bills (% of peoples age 15+)		0.08** (2.11)			
SPRED: Difference between average lending and deposit rates of interest	-0.10*** (-6.22)	-0.12*** (-3.04)	-0.15*** (-3.12)	-0.09*** (-5.75)	-0.09*** (-5.45)
NPL: Bank non-performing loans to gross loans (%)	0.11*** (6.33)	0.09*** (3.44)	0.14*** (6.25)	0.12*** (7.15)	0.12*** (6.50)
PCIGROW: GDP per capita growth (annual %)	0.001 (0.03)				
DBUS: New business density (new registrations per 1,000 people ages 15-64)	-0.13*** (-3.54)	-0.12 (-1.52)	-0.18*** (-3.31)	-0.14*** (-3.76)	-0.14*** (-3.75)
DCPS: Domestic credit to private sector (% of GDP)				0.01** (2.10)	0.01** (2.07)
DCPSF: Domestic credit (both private and public sectors) provided by financial sector (% of GDP)			0.001 (0.35)		
LABR: Labor force participation rate (% of total population ages 15-64)					-0.01 (-0.44)
Adjusted R-squared	0.20	0.28	0.30	0.23	0.22
Akaike info criterion	3.97	3.99	4.02	3.94	3.94
Schwarz criterion	4.04	4.16	4.14	4.01	4.02
Hannan-Quinn criterion	4.00	4.06	4.07	3.97	3.97
F-statistic	19.03	6.97	14.46	21.25	17.03

Table 10. Dependent Variable: Labor Force Participation Rate- % of total population ages 15-64 (LABR)

Method: Panel Least Squares
Sample (adjusted): 2008-2019
Periods included: 12; Cross-sections included: 147
Total panel (unbalanced) observations: 1386

Independent Variable/ Option	I	II	III	IV	V
Constant	61.48*** (101.91)	65.65*** (65.35)	63.97*** (52.44)	63.26*** (42.03)	49.79*** (13.42)
INTRNT: Individuals using the Internet (% of population)	0.08*** (6.76)		0.06*** (2.96)		-0.03 (-0.89)
MBLPMT: Mobile phone used to pay bills (% of peoples age 15+)				0.36*** (3.31)	0.25** (2.47)
DCPS: Domestic credit to private sector (% of GDP)	0.03*** (4.04)	0.04*** (3.93)	0.02 (1.41)	0.05** (2.54)	
DBUS: New business density (new registrations per 1,000 people ages 15-64)	0.20** (2.74)	0.44*** (3.91)	0.35*** (3.06)	0.26 (1.50)	
EASE: Ease of doing business score (0 for lowest to 100 for best)					0.29*** (3.63)
FINTCBIG: Credit flows by fintech and big tech companies as percentage of GDP		1.08 (0.95)	1.65 (1.46)		
GROW: GDP growth (annual %)	0.17** (2.55)	-0.02 (-0.15)	0.05 (0.34)	-0.05 (-0.19)	
PCIGROW: GDP per capita growth (annual %)					0.27 (1.14)
Adjusted R-squared	0.13	0.11	0.13	0.15	0.14
Akaike info criterion	7.29	7.33	7.29	7.30	7.36
Schwarz criterion	7.31	7.37	7.34	7.38	7.43
Hannan-Quinn criterion	7.30	7.35	7.31	7.34	7.39
F-statistic	53.48	17.21	15.69	10.67	11.26

Table 11. Dependent Variable: Unemployment -% of total labor force (UNEMPL)

Method: Panel Least Squares
Sample (adjusted): 2008-2020
Periods included: 13; Cross-sections included: 148
Total panel (unbalanced) observations: 1529

Independent Variable/ Option	I	II	III	IV	V
Constant	8.91*** (8.06)	9.54*** (27.18)	8.14*** (16.89)	9.88*** (27.99)	10.81*** (13.39)
INTRNT: Individuals using the Internet (% of population)	-0.03*** (-3.00)	-0.01* (-1.76)		-0.01** (-1.95)	-0.03* (-1.89)
GROW: GDP growth (annual %)	-0.33*** (-8.04)	-0.32*** (-9.04)	-0.47*** (-6.46)	-0.32*** (-8.96)	-0.20** (-2.57)
DBUS: New business density (new registrations per 1,000 people ages 15-64)	0.18*** (4.04)	0.23*** (5.17)	0.18*** (3.41)	0.25*** (5.67)	0.43*** (4.03)
DCPSB: Domestic credit to private sector by banks (% of GDP)				-0.02*** (-3.80)	
DCPSF: Domestic credit (both private and public sectors) provided by financial sector (% of GDP)					-0.01** (-2.50)
DCPS: Domestic credit to private sector (% of GDP)		-0.01*** (-2.95)	-0.01* (-1.72)		
FINTCBIG: Credit flows by fintech and big tech companies as percentage of GDP			-0.32 (-0.58)		

EASE: Ease of doing business score (0 for lowest to 100 for best)	0.02 (0.69)				
Adjusted R-squared	0.05	0.06	0.09	0.06	0.06
Akaike info criterion	6.40	6.33	5.86	6.37	6.50
Schwarz criterion	6.42	6.35	5.90	6.39	6.56
Hannan-Quinn criterion	6.40	6.34	5.88	6.38	6.52
F-statistic	19.66	25.52	14.19	26.49	6.45

Table 12. Dependent Variable: GDP Per Capita Growth- annual % (PCIGROW)

Method: Panel Least Squares
Sample (adjusted): 2013-2019
Periods included: 7; Cross-sections included: 95
Total panel (unbalanced) observations: 594

Dependent Variable	**Per Capita Income Growth**			**GDP Growth**	
Independent Variable/ Option	**I**	**II**	**III**	**IV**	**V**
Constant	0.72 (0.68)	2.87*** (8.49)	2.74*** (4.53)	4.64*** (14.16)	4.87*** (14.39)
FINTCBIG: Credit flows by fintech and big tech companies as percentage of GDP	0.99*** (2.13)	0.99*** (3.11)		1.15*** (3.71)	0.86** (2.68)
ELCPMT: Electronic payments used to make payments (% of peoples age 15+)			-0.02** (-2.09)		
TXTPRFT: Total tax and contribution rate (% of profit)		-0.02** (-2.60)	0.00 (0.39)	-0.01* (-1.82)	-0.03*** (-4.34)
CRPTN: Transparency, Accountability & Corruption in Public Sector Index		-0.31** (-2.30)	0.17 (0.58)	-0.31** (-2.19)	-0.75*** (-5.53)
EASE: Ease of doing business	0.03* (1.77)				
score (0 for lowest to 100 for best)					
CRCRD: Credit card users (% of peoples age 15+)	-0.03** (-2.46)				
DCPS: Domestic credit to private sector (% of GDP)				-0.01*** (-3.40)	
DBUS: New business density (new registrations per 1,000 people ages 15-64)		0.04 (1.12)	0.10** (2.20)		0.02 (0.68)
Adjusted R-squared	0.04	0.03	0.02	0.09	0.10
Akaike info criterion	4.35	4.80	4.69	4.79	4.80
Schwarz criterion	4.42	4.84	4.76	4.82	4.84
Hannan-Quinn criterion	4.38	4.82	4.72	4.80	4.82
F-statistic	3.60	5.49	2.01	15.01	15.95

Table 13. Dependent Variable: Possibility to arrange Emergency Funds in 30 days (30PSBL)

Method: Ordinary Least Squares (Cross Section)
No. of Countries: 155
Year: 2021

Dependent Variable	**30PSBL**		**30PSBL40**		**30BNK**
Independent Variable/ Option	**I**	**II**	**III**	**IV**	**V**
Constant	3.51 (0.92)	2.95 (0.75)	-1.54 (-0.41)	-1.54 (-0.40)	5.50*** (3.04)
ELCPMT: Electronic payments used to make payments (% of peoples age 15+)	0.24*** (3.86)	0.24*** (3.88)	0.18** (2.90)	0.18** (2.88)	-0.01 (-0.23)
CRCRD: Credit card users (% of peoples age 15+)	0.48*** (5.83)	0.46*** (4.98)	0.45*** (5.45)	0.45*** (4.91)	0.08* (1.90)

GROW: GDP growth (annual %)	-0.35 (-1.03)	-0.29 (-0.82)	-0.37 (-1.10)	-0.37 (-1.06)	0.30* (1.82)
CRDTDPS: Bank credit to bank deposits (%)	0.06** (2.74)	0.05* (1.91)	0.05** (2.24)	0.05* (1.86)	0.01 (0.50)
DCPSF1: Private credit by banks and other financial institutions to GDP (%)		0.02 (0.69)		0.0001 (0.00)	-0.02 (-1.29)
Adjusted R-squared	0.75	0.75	0.69	0.69	0.06
Akaike info criterion	7.49	7.51	7.47	7.49	5.96
Schwarz criterion	7.62	7.67	7.61	7.66	6.12
Hannan-Quinn criterion	7.55	7.57	7.53	7.56	6.03
Durbin-Watson Statistics	1.82	1.83	1.60	1.60	2.01
F-statistic	72.69	57.91	54.18	42.87	2.28

Table 14. Dependent Variable: Paying for Medical Costs is the Most Worrying Financial Issue (WORYMD)

Method: Ordinary Least Squares
No. of Countries 155 (Cross Section)
Year: 2021

Independent Variable/ Option	**I**	**II**	**III**	**IV**	**V**
Constant	41.46*** (11.66)	41.56*** (10.51)	42.92*** (9.72)	35.44*** (10.45)	36.41*** (10.45)
CRCRD: Credit card users (% of peoples age 15+)	-0.26*** (-3.01)	-0.26*** (-2.98)	-0.26*** (-3.00)	-0.21** (-2.41)	-0.21** (-2.48)
GROW: GDP growth (annual %)		0.12 (0.35)	0.12 (0.35)	0.14 (0.40)	
PCIGROW: GDP per capita growth (annual %)	0.20 (0.64)				0.24 (0.74)
CRDTDPS: Bank credit to bank deposits (%)	0.003 (0.13)	0.003 (0.15)	0.004 (0.18)	0.01 (0.35)	0.01 (0.42)
UNEMPL: Unemployment (% of total labor force)			-0.15 (-0.70)		-0.15 (-0.71)
EFCTV: Government Effectiveness Index				-0.88 (-0.29)	-1.73 (-0.55)
ELCPMT: Electronic payments used to make payments (% of peoples age 15+)	-0.08 (-1.31)	-0.08 (-1.28)	-0.09 (-1.33)		
CRPTN: Transparency, Accountability & Corruption in Public Sector Index				-3.15 (-1.17)	-2.55 (-0.92)
Adjusted R-squared	0.33	0.33	0.33	0.34	0.34
Akaike info criterion	7.56	7.57	7.58	7.56	7.57
Schwarz criterion	7.70	7.70	7.74	7.72	7.76
Hannan-Quinn criterion	7.62	7.62	7.65	7.62	7.65
Durbin-Watson Statistics	1.57	1.54	1.52	1.51	1.52
F-statistic	12.89	12.77	10.26	10.91	9.20

6. Policy Recommendations and Limitations

The empirical evidences in this study confirm the effectiveness of the use of financial technology in poverty alleviation and creating employment opportunities. Similarly, the use of financial technology and growth in credit to private sector enhance the magnitude of labor participation (LABR) and alleviate unemployment. It implies that monetary policy can play an important role by encouraging the size of credit to private sector (DCPS) and recognition of the digital modes of monetary transactions (flow of funds by fintech companies, use of internet and use of mobile phone for monetary transactions).

Based on empirical evidences, the most important and interesting conclusion belongs to the role of credit flows by fintech and big technology companies. The negative sign with the beta associated with the credit flows by fintech and big technology companies indicates that higher credit flows by fintech and big technology companies alleviate the poverty. This relation was tested in five alternative options, where some control variables have been added. Another objective of the estimation of poverty trough alternative option was to conduct the falsification tests. It can be observed that results are statistically significant and parameters are robust in all scenarios.

This study has recognized the role of growth in per capital income in alleviation of poverty, however, growth in GDP or per capita GDP is not significant in determination of income inequality (Gini index). In establishing the relation between economic growth and income distribution, Asian Development Bank (2010) has mentioned that strong economic growth in Asia is accompanied by the emergence of a sizable middle class and a significant reduction in poverty. According to the report, higher share of urban population, share of services in GDP, trade openness and share of services in trade are the significant factor of rise in the number of middle-class peoples.

According to the statistical results the more use of electronic payment and credit cards play a very positive and significant role in developing the perception that peoples can arrange money withing 30 days in case of financial emergencies. The more use of electronic payments and credit cards improves the peoples' perception that they can arrange money during the crisis. The aggregate credit to deposit ratios in the banks also plays a positive role in developing this perception. Similarly in determination of the peoples' perception that their top most financial problem is to arrange money in case of a medical emergency due to a critical disease or accident, availability of credit cards is the only significant variable.

All these findings are important for monetary policy to devise the mechanism to recognize and encourage the use of electronic modes of monetary transactions.

References

Alesina, Alberto and Dani Rodrik (1994). Distributive Politics and Economic Growth; Quarterly Journal of Economics, 109 (2), 465–490

Aloysius Uche Ordu, Ali Zafar, and Jan Muenc (2021). Regional Integration in West Africa: Is West Africa ready for a single currency? Brookings Institution, 2021 (July)

Ashoka Mody (2018). Euro Tragedy: A Drama in Nine Acts. Oxford: Oxford University Press, 2018

Asian Development Bank (2010). Key Indicators for Asia and the Pacific 2010: The Rise of Asia's Middle Class (Special Chapter). Mandaluyong City, 2010.

Banerjee, Abhijit and Esther Duflo (2008). What is Middle Class about the Middle Classes around the World? Journal of Economic Perspectives. 22 (2); 3-28

Belesity Bekalu Ayenew (2022). The Impact of Foreign Financial Inflows on the Economic Growth of Sub-Saharan African Countries: An Empirical Approach. Cogent Economics and Finance, Vol 10 No.1, 1-12

Bogle, John (2005). The Battle for the Soul of Capitalism. Yale University Press, 2005

Bosworth, Barry (1975). The Stock Market and the Economy. Brooking Papers on Economic Activity, Vol. 75 (2), 257-300

Bonga-Bonga L. and Mabe Q M (2019). How Financially Integrated are Trading Blocs in Africa? Quarterly Review of Economics and Finance; 75 (84)

Charis Vlados, Dimos Chatzinikolaou, and Badar Alam Iqbal (2022). New Globalization and Multipolarity: A Critical Review and the Regional Comprehensive Economic Partnership Case. Journal of Economic Integration, Vol. 37, No. 3, 458-483

Christian Haddad and Lars Hornuf (2019). The Emergence of the Global Fintech Market: Economic and Technological Determinants. Small Business Economics, Vol. 53; 81-105

Credit Suisse Research Institute (2019). Global Wealth Report; Credit Suisse AG, 2019 (www.credit-suisse.com)

Darjana Darjana, Wiryono, S.K., Koesrindartoto, D.P. (2022). The COVID-19 Pandemic Impact on Banking Sector. Asian Economics Letters Vol. 3, No.1, 1-6

Debrun, Xavier, Paul Masson, and Catherine Pattillo (2002). Monetary Unions in West Africa: Who Might Gain, Who Might Lose and Why? IMF Working Paper 02/226. Washington: International Monetary Fund, 2022

Devi Prasad Dash and Narayan Sethi (2022). Pandemics, Lockdown and Economic Growth: A Region-Specific Perspective on Covid-19. Bulletin of Monetary Economics and Banking. Special Issue 43 - 60

Dimand, Robert (1988). The Origins of the Keynesian Revolution in Aldershot Edward Elgar "Study of the Evolution of Keynes's Ideas". 1988

Durrani, A., M. Rosmin, and U. Volz (2020). The role of Central banks in Scaling up Sustainable Finance – What do Monetary Authorities in the Asia-Pacific Region Think? Journal of Sustainable Finance and Investment, 10 (2): 92–112

Erturk, Ismail, Julie Froud, Sukhdev Johal, Adam Leaver and Karel Williams (2007). The Democratization of Finance? Promises, Outcomes and Conditions; Review of International Political Economy; 14 (4); 553-575

Facundo Alvaredo, Lucas Chancel, Thomas Piketty, Emmanuel Saez and Gabriel Zucman (2018). World Inequality Report. World Inequality Database, 2018

Florian Zandt (2021). The Hotspots of Modern Slavery: Forced Labor and Forced Marriage. 2021 (December 02)

Fukuyama, Francis (1992). The End of History and The Last Man. Free Press, 1992

Fukuyama, Francis (2005). Building Democracy after Conflict: Stateless First. Journal of Democracy; 16 (1); 84-88

Gordon, Robert J. (1990). What Is New-Keynesian Economics? Journal of Economic Literature. 28 (3): 1115–71

Guizhou Wang & Kjell Hausken (2022). A Game between Central Banks and Households Involving Central Bank Digital Currencies, Other Digital Currencies and Negative Interest Rates. Cogent Economics and Finance, Vol 10 No. 1, 1-23

Helen V. Milner (1998). International Political Economy: Beyond Hegemonic Stability. Foreign Policy, Spring 1999

Hicks, John (1967). Critical Essays in Monetary Theory. Oxford: Oxford University Press, 1967

Inderst (2018). Infrastructure Investment, Private Finance, and Institutional Investors: Asia from a Global Perspective in 'Financing Infrastructure in Asia and the Pacific Capturing Impacts and New Sources'; Tokyo: Asian Development Bank Institute, 2018

International Fund for Agricultural Development and the World Bank Group (2015). The Use of Remittances and Financial Inclusion; Washington: World Bank, 2015

International Monetary Fund (2020a). The Great Lockdown – World Economic Outlook. Washington: International Monetary Fund, 2020

International Monetary Fund (2020b). World Economic Outlook Update. Washington: International Monetary Fund; 2020

International Monetary Fund (2021). Policy reforms to COVID-19. Washington: International Monetary Fund, 2021

Juan Antonio Montecino and Gerald Epstein (2015). Did Quantitative Easing Increase Income Inequality? Working Paper No. 28; New York: Institute of New Economic Thinking (2015)

Keynes, John Maynard (1936). The General Theory of Employment, Interest and Money. Basingstoke, Hampshire: Palgrave Macmillan (Archived from the original article) 2017

Kindleberger, Charles P (1970). Power and Money: The Economics of International Politics and the Politics of International Economics. Basic Books Incorporated, 1970

Krugman Paul (2020). Notes on the Coronavirus: The Economic Equivalent of a Medically Induced Coma. The New York Times; 2020 (1st April)

Langdana, Farrokh K. (2002). Macroeconomic Policy: Demystifying Monetary and Fiscal Policy. Springer Science and Business Media (2002)

Marlene Amstad, Bihong Huang, Peter J. Morgan, and Sayuri Shirai (2019). Introduction and Overview in Marlene Amstad, Bihong Huang, Peter J. Morgan, and Sayuri Shirai "Central Bank Digital Currency and Fintech in Asia". Tokyo: Asian Development Bank Institute, 2019

Masson, Paul and Catherine Pattillo (2004). A single Currency for Africa; Finance & Development; 2004 (December)

Masson, Paul, and Catherine Pattillo (2002). Monetary Union in West Africa: An Agency of Restraint for Fiscal Policies?" Journal of African Economies, Vol.11 (September); 387–412

McMurty, John (1999). The Cancer Stage of Capitalism: From Crisis to Cure. Pluto Press; (Second Edition), 1999

Mehar, M. Ayub. (2018). Impact of Monetary Policy on Growth and Poverty: Drastic Consequences of Government Intervention'; Journal of Modern Economy, 2018,1:1.

Mehar, M. Ayub (2005). Is debt a Substitute of Equity? Relevancy of Financial Policy in New Economic Scenarios; Applied Financial Economics; 2005, 15, 337–366

Mehar, M. Ayub (2011). How Monetary Policy affects Poverty? Nexus and Consequences. South Asian Journal of Management. Vol. 5, No. 1, 1-10

Mehar, M. Ayub (2014); Infrastructure Development by Liberalizing Economic Policies: The Straight Path of Economic Prosperity; Islamabad: Friedrich Naumann Stiftung (Fur Die Freiheit)/ EFN Pakistan, 2014

Mehar, M. Ayub (2017). Infrastructure Development, CPEC and FDI in Pakistan: Is There a Connection? Journal of Transnational Corporations, Switzerland (Special Issue on FDI), 1-10

Mehar, M. Ayub (2020). Measuring Impacts and Financing Infrastructure in Pakistan. Role of Public Private Partnership. Tokyo: Asian Development Bank Institute (WP No. 1149, 2020)

Mehar, M. Ayub (2021). Bridge Financing during Covid-19 Pandemics: Nexus of FDI, External Borrowing and Fiscal Policy; Transnational Corporations Review; 2021 1-16

Mehar, A. Ayub (2022a); "COVID-19, Digital Transactions, and Economic Activities: The Puzzling Nexus of Wealth Enhancement, Trade, and Financial Technology" in John Beirne, James Villafuerte, and Bryan Zhang "FINTECH and COVID-19: Impacts, Challenges and Policy Priorities for Asia" (pp 07-34); Cambridge: University of Cambridge, 2022

Michael McLeay, Amar Radia and Ryland Thomas (2014). Money Creation in the Modern Economy: An Introduction. Bank of England: Quarterly Bulletin 2014 (1st quarter)

Mundell, Robert (1961). A Theory of Optimum Currency Areas; American Economic Review; Vol.51 (September), 657–65

Nguyen, Kim Quoc Trung (2022); Does Leverage fit Non-performing Loans in the COVID-19 Pandemic – Evidence from the Vietnamese Banking System; Cogent Business and Management, Vol. 9, No. 1, 1-17

Ninan, TN (2020); Indian Economy is Heading for a K-shaped Recovery and It Won't be a Pretty Sight'. The Print: 5th September 2020

Ocampo, Jose Antonio (2005). Beyond Reforms: Structural Dynamics and Macroeconomic Vulnerability. Washington: World Bank, 2005

Olayungbo, David and Badar Alam Iqbal (2021); An Empirical Analysis of African Trade Blocs Effects on the Global Economy: New Evidence from the Gravity Model. Future Business Journal, 7(1): 45

Paresh Kumar Narayan and Solikin M. Juhro (2022). Editorial in Special Issue on Stimulating Economic Recovery, Promoting Sustainable Inclusive Growth: Challenges and Opportunities. Bulletin of Monetary Economics and Banking, Special Issue 61-84

Prabheesh, K. P, (2022). Editorial in Special Issue on COVID-19 and its Impact on Asian Economies. Asian Economics Letters, Vol. 3 No. 2

Prasad, Eswar and Vera Songwe (2021). Regional Integration in West Africa: Is There a Role for a Single Currency. Washington: Brookings Institution, 2021

Robert Gordon (2008). "'Did Liberals Cause the Sub-Prime Crisis?'". American Prospect. (Retrieved May 1, 2010)

Rogoff, Kenneth (2020). The Covid-19 Recession could be far Worse than 2008. Devos: World Economic Forum, 2020

Sachs, J. Schmidt-Traub, G. Kroll, C. Lafortune, G. Fuller, G. Woelm, F (2020). The Sustainable Development Goals and Covid-19. Sustainable Development Report. Cambridge: Cambridge University Press, 2020

Smith, Adam (1759). Theory of the Moral Sentiments. London: The Adam Smith Institute, 1999

Smith, Adam (1776). An Inquiry into the Nature and Causes of the Wealth of Nations. Philadelphia: Thomas Dobson, 1789

Statistica (2021). Global Data (https://www.statista.com); Hamburg, 2021

Stefan, Stremerscha and Gerard J. Tellisc (2004). Understanding and Managing International Growth of New Products. International Journal of Research in Marketing 21 (2004) 421–438

Stein, Jerome L (1982). Monetarist, Keynesian & New Classical Economics. Oxford: Blackwell: 1982

Stijn Claessens, Jon Frost, Grant Turner and Feng Zhu (2018). Fintech Credit Markets around the World: Size, Drivers and Policy Issues; BIS Quarterly Review; 2018 (September)

The Economist (1997). Interface-AIF Survey. November 22, 1997

The Economist (2000). Survey Sponsored by Sofinco- a subsidiary of Credit Agricole. March 25, 2000

The Economist (2001). The New Wealth of Nations: A Survey of the New Richs. London: June 16th, 2001

The Economist (2009). When a Flow Becomes a Flood. January 22, 2009

The Economist (2009a) Poverty. May 30, 2009

The Economist (2009b). Survey on Poverty. April 04, 2009

The Economist, (1999). Finance and Capitalism. December 19, 1999 (Millennium Issue)

University of Cambridge (2020). Brain Food: Economic Impact. Centre for Risk Studies at the University of Cambridge Judge Business School, 2020

Velde, Francois R. (2002). Following the Yellow Brick Road: How the United States Adopted the Gold Standard; Economic Perspectives, 2002 (4th quarter)

World Bank (2017). Global Financial Inclusion and Consumer Protection Survey. Washington: The World Bank Group, 2017

World Bank (2019). Global Financial Development Report 2019 / 2020: Bank Regulation and Supervision a Decade after the Global Financial Crisis. Washington: The World Bank Group, 2019

World Bank (2020). Poverty and Shared Prosperity: Reversal of Fortune. Washington: The World Bank Group, 2020

World Bank (2020a). Global Economic Prospects. Washington: The World Bank Group: 2020

World Bank (2023). World development indicators. Washington: The World Bank Group (2023)

World Economic Forum (2020). The Global Competitiveness Report (Special edition): How Countries are Performing on the Road to Recovery. Geneva: World Economic Forum, 2020

World Economic Forum (2021). The Global Risks Report 2021 (16th edition). Geneva: World Economic Forum, 2021

World Trade Organization (2020). World Trade Report 2020. Government Policies to Promote Innovation in the Digital Age. Geneva: World Trade Organization, 2020

Yuksel Gormez (2019). Central Bank Digital Currency: A Historical Perspective in Marlene Amstad, Bihong Huang, Peter J. Morgan, and Sayuri Shirai "Central Bank Digital Currency and Fintech in Asia". Tokyo: Asian Development Bank Institute, 2019

Zhong Xu and Ruihui Xu (2019). Regulating Fintech for Sustainable Development in the People's Republic of China" in Marlene Amstad, Bihong Huang, Peter J. Morgan, and Sayuri Shirai "Central bank digital currency and Fintech in Asia". Tokyo: Asian Development Bank Institute, 2019