Financial inclusion and legal system quality: are they correlated?

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Abstract

This study investigates the correlation between financial inclusion and legal system quality among developed countries from 2004 to 2012. The findings reveal a positive correlation between financial inclusion and legal system quality. The findings suggest that improvements in legal system quality goes hand in hand with improvements in the level of financial inclusion. More specifically, higher supply of ATM per 100,000 adults is correlated with stronger insolvency resolution framework among G7, European and non-European countries. Also, the number of bank branch per 100,000 adults is positively correlated with strong rule of law and legal rights in non-European countries. Also, the number of ATMs per 100,000 adults is positively correlated with strength of insolvency resolution framework and negatively correlated with the time it takes to resolve insolvency before, during and after the global financial crisis.

Keywords: Law, development, financial inclusion, ATM, bank branch, legal rights, legal system, rule of law, insolvency resolution.

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1. Introduction

This study explores the correlation between financial inclusion and legal system quality.

Legal system quality has been drawing significant attention from researchers and policymakers for quite some time because of its positive effects for development and poverty alleviation. Legal system quality plays a major role in protecting the poor from unfair dealings and exploitation from powerful individuals and corporations (see Pearson, 1970; Jiong, 2017; Boone, 2019). Tebaldi and Mohan (2010) show that the presence of rule of law is associated with low poverty levels. Also, Khanam (2021) shows that poverty reduction is difficult in the absence of rule of law. Meanwhile, Anderson (2003) examined poverty in the context of developing and developed countries, and show that people in developed countries have more access and are frequent users of the legal system than people in developing countries. These three studies suggest that a good legal system has positive effects for development and poverty alleviation.

A legal system consists of a set of coordinated rules created, interpreted and enforced through social or governmental institutions to regulate behavior, including the behavior of corporations that provide basic financial services to banked and unbanked adults. The legal system provides an avenue for people to hold public officials and corporations to account, protect themselves from exploitation by those with more power, and resolve conflicts that are individual or collective (Anderson, 2003). On the other hand, financial inclusion involves bringing the unbanked population into the formal financial sector by ensuring that adults own a formal account (Allen et al, 2016). Financial inclusion gives adults access to financial services, such as credit and savings products, which they can use to improve their wellbeing and that of their household. Financial inclusion has positive effects for poverty reduction, financial development, employment, gender equality and financial stability, as shown by Li (2018), Sarma and Pais (2011), Geng and He (2021), Manji (2010), Ghosh and Vinod (2017), and Hannig and Jansen (2010).

In the case of financial inclusion, studies show that financial inclusion has been a development policy priority in many countries (Chibba, 2009; Sarma and Pais, 2011; Ozili, 2020). Existing research show that financial inclusion is positively related to poverty reduction (Chibba, 2009),

development (Allen et al, 2014), urbanization (Sarma and Pais, 2011), financial access (Allen et al, 2014), digital financial innovation (Ozili, 2018) and income equality (Chibba, 2009).

When the level of financial inclusion and legal system quality increases, there will be greater access to finance for the underserved members of society and there will also be strong legal protection to protect the underserved members of society from unfair income discrimination, racial discrimination and other forms of exclusion and discriminatory practices of formal financial institutions. Therefore, I expect financial inclusion and legal system quality to complement each other and exhibit a positive correlation.

Very few studies have investigated the correlation between financial inclusion and law.[1] The present study contributes to the literature not only by filling this research gap but also by providing some useful policy implications. The novelty of this study lies in using financial access indicators as proxies for financial inclusion such as ATMs per 100,000 adults and bank branch per 100,000 adults, and using the 'rule of law' index as a proxy for legal system quality alongside other indicators of legal system quality such as the enforcing contracts index, strength of legal rights index, resolving insolvency index, strength of insolvency framework index, and time to resolving insolvency index.

To examine the correlation between financial inclusion and legal system quality, I use a dataset that covers 27 developed countries (for which financial inclusion data are consistently available) from 2004 to 2012 at a yearly frequency.

The study finds a significant positive correlation between financial inclusion and legal system quality. More specifically, greater ATM supply is correlated with stronger insolvency resolution in G7, European and non-European countries. Also, higher number of bank branch per 100,000 adults is correlated with strong rule of law and legal rights in non-European countries. Furthermore, the number of ATMs per 100,000 adults is positively correlated with strength of insolvency resolution and negatively correlated with the time it takes to resolve insolvency

[1] Demirgüç-Kunt et al (2013) analyse the relationship between financial inclusion and legal discrimination of women in developing countries. They found that, in countries where women face legal restrictions in their ability to work, head a household, choose where to live, and receive inheritance, such women are less likely to own an account, save or borrow compared to men.

before, during and after the global financial crisis. Also, financial inclusion, measured by the number of bank branch per 100,000 adults, is negatively correlated with the strength of contract enforcement in the pre-, during- and post- financial crisis period.

This study makes several contributions to the literature. Firstly, this study enhances the economic development literature by showing that financial inclusion and legal system quality are complementary tools that can help to achieve higher levels of economic development. This is the first study to explore the direct correlation between financial inclusion and legal system quality. I show that there is a positive correlation between financial inclusion and legal system quality which suggest that the two variables could together improve development outcomes. Therefore, I recommend that for countries to have better development outcomes, they have to harness the combined benefits of greater financial inclusion and better legal system quality.

Secondly, the study contributes to the law and development literature. I provide evidence that improving legal system quality can protect the underserved members of the population from being exploited by formal financial institutions, which gives them more confidence and trust to join and participate meaningfully in the formal financial sector. Finally, the results contribute to the development policy literature in that it offers useful insights to governments when planning to introduce policies that improve existing levels of financial inclusion. The government should first strengthen legal institutions and develop effective legal rules that protect citizens – as this is needed to lay the foundation for a financially inclusive society.

The rest of this paper is structured as follows. Section 2 presents a review of the literature. Section 3 provides the data source, variable description and methodology. Section 4 reports the correlation analysis. Section 5 reports the empirical results. Section 6 discusses the robustness checks. Finally, section 7 provides the conclusions.

2. Literature review

Early law studies show that a legal system can promote social and economic development. Posner (1998) show that modernizing a nation's economic prosperity requires at least a modest legal infrastructure centered on the protection of property and contract rights. Davis and Trebilcock (2008) show that law is an important factor in determining social or economic outcomes particularly in developing societies. Levine (1998) and Zhiwu (2003) and Dam (2007) show that legal institutions matter for economic growth and development.

In the theoretical literature, some studies examine the role of law in promoting financial development. La Porta et al (1997) show that in countries where legal systems enforce private property rights, support private contractual arrangements, and protect the legal right of investors, savers are more willing to finance firms and financial markets will flourish. Bottazzi et al (2009) show that investors are willing to support firms' growth only when there is strong legal protection for investors. Lu and Yao (2009) find that enhanced legal system increases the private share of bank credit and bank competition. Claessens and Laeven (2003) argue that, in countries with more secure property rights, firms might allocate resources better and consequentially grow faster as the returns on different types of assets are more protected against competitors' actions. Chinn and Ito (2006) observe that a higher level of financial liberalisation spurs equity market development only if a threshold level of legal development has been attained.

In the financial inclusion literature, there is some consensus that financial inclusion leads to better development outcomes. For instance, Ardic et al (2011) find that a larger number of accounts and a larger number of bank branches per adult are associated with a greater percentage of banked households, thereby leading to higher financial inclusion. Raza et al (2019) find a positive relationship between financial inclusion and economic development; specifically, an increase in the number of bank branches (per 100,000 people) have a positive relationship with the human development index while increase in the number of automated teller machines per 1,000 km2 (per cent) has a negative relationship with the human development index. Ozili (2018) and Gabor and Brooks (2017) show that digital-based financial inclusion leads to improvements in the welfare of households and banked adults. Financial inclusion also has

positive effects for poverty reduction, financial development and financial stability, as shown by Li (2018), Sarma and Pais (2011), Geng and He (2021), and Hannig and Jansen (2010). Despite the evidence presented in these studies, the literature has not examined the relationship between financial inclusion and legal system quality. This paper fills this research gap.

3. Research design

3.1. Data

The dataset covers 27 developed countries for which financial inclusion and legal system quality variables are consistently available. The sample period is from 2004 to 2012 at a yearly frequency. The full sample data was divided into different groups: the European country category, the non-European country category and the G7 (or most developed country) category[2]. Using the dataset, I first conducted a full sample analysis. Thereafter, I undertake a subsample analysis to determine the correlation between financial inclusion and legal system quality in the three sub-samples. I expect that the correlation between financial inclusion and legal system quality could have different impacts in the subsamples. The subsamples are shown in the last column of table 2 in section 3.4.

3.2. Variable description

The two financial inclusion variables used in this study are considered to be financial access indicators, namely, the ATMs per 100,000 adults variable and the bank branch per 100,000 adults variable. These two indicators have been widely used as measures of financial access and measures of financial inclusion by several studies in the literature such as Neaime and Gaysset (2018), Emara and El Said (2021) and Ozili (2021). The legal system quality indicators are: the enforcing contracts index, the strength of legal rights index, the resolving insolvency index, the strength of insolvency framework index, and the time to resolving insolvency index. All variables

[2] We did not categorize the data into the developing country category because there are no developing countries in the data sample.

for the financial inclusion and legal system quality variables were collected from the World Bank database. See table 1 for detailed description of the variables.

Table 1: Variable description

	Indicator Name	Long definition	Source
DF	Enforcing contracts index	The index for enforcing contracts is the simple average of the index for each of the component indicators: the procedures, time and cost for resolving a commercial dispute through a local first-instance court.	World Bank, Doing Business indicator
DN	Strength of legal rights index	The strength of legal rights index measures whether certain features that facilitate lending exist within the applicable collateral and bankruptcy laws.	World Bank, Doing Business indicator
TR	Resolving insolvency index	The index for resolving insolvency is the simple average of the scores for each of the component indicators: the recovery rate of insolvency proceedings involving domestic entities, as well as the strength of the legal framework applicable to judicial liquidation and reorganization proceedings.	World Bank, Doing Business indicator
WE	Strength of insolvency framework index	The strength of insolvency framework index measures the legal framework applicable to judicial liquidation and reorganization proceedings and the extent to which best insolvency practices have been implemented in each economy covered by the Doing Business. This index ranges has four components, the commencement of proceedings index, management of debtor's assets index, reorganization proceedings index and creditor participation index.	World Bank, Doing Business indicator
WN	Time (years)	The time to resolve insolvency captures the time for creditors to recover their credit and is recorded in calendar years. Potential delay tactics by the parties, such as the filing of dilatory appeals or requests for extension, are taken into consideration.	World Bank, Doing Business indicator
LEGAL	Rule of law	Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.	
BR	Bank branches per 100,000 adults	The number of commercial bank branches per 100,000 adults	World Bank, Global financial development indicators
ATM	ATMs per 100,000 adults	The number of automated teller machines per 100,000 adults. It provides banked adults with access to finance in a public space	World Bank, Global financial development indicators

3.3. Methodology

The Pearson correlation test statistic was used to determine the correlation between financial inclusion and legal system quality. The Pearson correlation test statistic is a widely used measure of the strength of linear correlation between two sets of data in the economics and development literature (see, for example, King and Levine (1993), Benesty et al (2009), Gujarati et al (2012), Wang et al (2018), Paraschiv (2017) and Xu et al (2020)). The Pearson correlation test statistic measures the strength of the correlation between two variables or datasets (Gujarati et al, 2012). In the correlation analysis, the correlation coefficients and the associated p-values (in parenthesis) are reported in section 4.

3.4. Descriptive statistics

The mean values of the variables are reported in the descriptive statistics in Table 2. For the financial inclusion variables, the full sample average for the ATM variable is 99 and is higher in Canada and Korea, and much lower in Poland and Turkey. BR is 33 on average, and is higher in Spain and Portugal, and much lower in Norway and Austria.

For the legal system quality variables, the LEGAL variable is 1.33 on average, and is higher in Denmark and Finland, and lower in Turkey and Greece. DF is 67 on average, and is higher in Austria, and much lower in Italy. DN is 64 on average, and is much higher in United Kingdom and Australia, and much lower in Portugal, Italy and Greece. TR is 69 on average, and is higher in Finland and Germany, and much lower in Turkey. WE is 70 on average, and is higher in Germany and the United states and much lower in Greece. WN is 1.94 on average, and is higher in Czech Republic and much lower in Ireland. The descriptive statistics show cross-country variations in the levels of financial inclusion and legal system quality.

Table 2: Descriptive statistics (mean values)

	Country	ATMs	BR	LEGAL	DF	DN	TR	WE	WN	Country Category
1	Australia	156	31	1.76	76	90	74	62	1	Non-European
2	Austria	111	13	1.85	80	60	73	68	1.1	European
3	Belgium	87	49	1.34	76	50	77	62.	0.9	European
4	Canada	207	24	1.76	63	70	80	63	0.8	G7/Non-European
5	Czech Republic	39	22	0.92	64	65	51	73.	6.96	European
6	Denmark	65	45	1.94	69	87	73	63	2.03	European
7	Finland	53	15	1.95	76	80	92	89	0.9	European
8	France	100	38	1.46	76	43	53	57	1.9	G7/European
9	Germany	114	16	1.68	76	75	90	93	1.2	G7/European
10	Greece	75	39	0.73	51	30	44	41	2	European
11	Hungary	50	16	0.84	68	70	51	62	2	European
12	Ireland	90	31	1.70	78	90	79	65	0.4	European
13	Italy	91	58	0.46	38	30	66	70	1.8	G7/European
14	Japan	127	34	1.31	-	-	-	81	-	G7/Non-European
15	Korea	244	17	0.96	78	60	81	75	1.5	Non-European
16	Netherlands	59	26	1.79	74.	50	82.	71	1.1	European
17	Norway	57	11	1.93	74	60	84	71	0.9	European
18	Poland	41	30	0.57	54	83	55	75	3	European
19	Portugal	176	65	1.07	56	30	80	82	2	European
20	Slovak Republic	47	26	0.54	64	80	62	76.	4.2	European
21	Slovenia	95	39	0.97	49	45	60	71	2	European
22	Spain	149	97	1.15	61	60	71	65	1.5	European
23	Sweden	40	23	1.91	66	82	78	75	2	European
24	Switzerland	93	53	1.81	68	80	59	68	3	European
25	Turkey	43	16	0.08	64	40	33.	48	3.3	European
26	United Kingdom	122	25	1.69	67	100	80	68	1	G7/European
27	United States	169	34	1.59	-	-	-	93	-	G7/Non-European
	Full sample:									
	*Average (mean)	99	33	1.33	67	64	69	70	1.94	
	observations	235	241	243	225	200	225	243	225	

All means are approximated to the nearest whole numbers except for WN and LEGAL. Variable description: DF = Enforcing contracts index. DN = Strength of legal rights index. TR = Resolving insolvency index. WE = Strength of insolvency framework index. WN = Time to resolve insolvency (years). LEGAL = Rule of law. BR = Bank branches per 100,000 adults. ATM = ATMs per 100,000 adults.

4. Results

4.1. Full sample correlation analysis

Only the statistically significant correlation results are interpreted. In table 3, the ATM variable is positively correlated with the LEGAL, DF, TR and WE variables in the full sample correlation analysis. However, only the TR variable is positively significant, implying that there is greater ATM supply in countries that have a strong framework for insolvency resolution. Meanwhile, ATM is negatively correlated with the DN and WN variables. However, only the WN variable is negatively significant in the full sample correlation analysis, implying that there is greater ATM supply in countries that have a shorter time to resolve insolvency. On the other hand, the BR variable is negatively correlated with the LEGAL, DF, DN, TR, WE and WN variables. However, only the LEGAL and DN variables are negatively significant, implying that there is greater bank branch presence in countries that have lower levels of legal rights and rule of law.

Table 3: Full sample (Pearson correlation results)

Variables	ATM	BR	LEGAL	DF	DN	TR	WE	WN
ATM	1.000							

BR	0.251***	1.000						
	(0.00)	-----						
LEGAL	0.110	-0.153**	1.000					
	(0.12)	(0.03)	-----					
DF	0.099	-0.442	0.620***	1.000				
	(0.16)	(0.00)	(0.00)	-----				
DN	-0.092	-0.285***	0.487***	0.428***	1.000			
	(0.19)	(0.00)	(0.00)	(0.00)	-----			
TR	0.351***	-0.033	0.653***	0.380***	0.304***	1.000		
	(0.00)	(0.63)	(0.00)	(0.00)	(0.00)	-----		
WE	0.074	-0.053	0.174**	0.055	0.206***	0.642***	1.000	
	(0.30)	(0.45)	(0.01)	(0.44)	(0.00)	(0.00)	-----	

WN	-0.353***	-0.017	-0.493***	-0.291***	-0.051	-0.620***	-0.035	1.000
	(0.00)	(0.80)	(0.00)	(0.00)	(0.47)	(0.00)	(0.62)	-----

P-values are reported in parenthesis. ***, **, * denote statistical significance at the 1%, 5% and 10% level. DF = Enforcing contracts index. DN = Strength of legal rights index. TR = Resolving insolvency index. WE = Strength of insolvency framework index. WN = Time to resolve insolvency (years). LEGAL = Rule of law. BR = Bank branches per 100,000 adults. ATM = ATMs per 100,000 adults.

4.2. Regional results

4.2.1. G7 countries

Only the statistically significant correlation results are interpreted. In table 4, the ATM variable is positively correlated with the LEGAL, DF, DN and TR variables in G7 countries. However, only the LEGAL, DN and TR variables are positively significant, implying that there is greater number of ATM supply in G7 countries that have strong rule of law, strong legal rights and strong frameworks for insolvency resolution. Meanwhile, ATM is negatively correlated with the WE and WN variables. However, only the WN variable is negatively significant, implying that there is greater ATM supply in G7 countries that have a shorter time to resolve insolvency.

On the other hand, the BR variable is significant and negatively correlated with the LEGAL, DF, DN, TR and WE variables, implying that there is greater number of bank branches in G7 countries that have lower low levels of contract enforcement, legal rights, rule of law and insolvency resolution frameworks. Meanwhile, BR is positively correlated with the WN variable, implying that there is greater number of bank branches in G7 countries that have a longer time to resolve insolvency.

Table 4: Most developed countries - G7- Countries (Pearson correlation results)

Variables	ATM	BR	LEGAL	DF	DN	TR	WE	WN
ATM	1.000							

BR	-0.485***	1.000						
	(0.00)	-----						
LEGAL	0.528***	-0.892***	1.000					
	(0.00)	(0.00)	-----					
DF	0.107	-0.711***	0.840***	1.000				
	(0.54)	(0.00)	(0.00)	-----				
DN	0.347**	-0.829***	0.783***	0.499***	1.000			
	(0.04)	(0.00)	(0.00)	(0.00)	-----			
TR	0.370**	-0.733***	0.387**	0.102	0.636***	1.000		
	(0.03)	(0.00)	(0.02)	(0.56)	(0.00)	-----		
WE	-0.219	-0.368**	-0.034	0.057	0.159	0.715***	1.000	
	(0.21)	(0.03)	(0.84)	(0.74)	(0.36)	(0.00)	-----	
WN	-0.766***	0.805***	-0.690***	-0.234	-0.800***	-0.788***	-0.157	1.000
	(0.00)	(0.00)	(0.00)	(0.18)	(0.00)	(0.00)	(0.37)	-----

P-values are reported in parenthesis. ***, **, * denote statistical significance at the 1%, 5% and 10% level. DF = Enforcing contracts index. DN = Strength of legal rights index. TR = Resolving insolvency index. WE = Strength of insolvency framework index. WN = Time to resolve insolvency (years). LEGAL = Rule of law. BR = Bank branches per 100,000 adults. ATM = ATMs per 100,000 adults.

4.2.2. European countries

Only the statistically significant correlation results are interpreted. In table 5, the ATM variable is positively correlated with the LEGAL, WE and TR variables in European countries. However, only the TR and WE variables are positively significant, implying that there is greater number of ATM supply in European countries that have strong frameworks for insolvency resolution. Meanwhile, ATM is negatively correlated with the DF, DN and WN variables. However, only the DN and WN

variables are negatively significant, implying that there is greater ATM supply in European countries that have low legal rights and shorter time to resolve insolvency.

On the other hand, the BR variable is significant and negatively correlated with the LEGAL, DF, DN and WN variables, implying that there is greater number of bank branches in European countries that have weak rule of law, low contract enforcement, legal rights and shorter time to insolvency resolution. Meanwhile, BR is positively correlated with the WE and TR variables but the two variables are insignificant.

Table 5: European countries (Pearson correlation results)

Variables	ATM	BR	LEGAL	DF	DN	TR	WE	WN
ATM	1.000							

BR	0.627***	1.000						
	(0.00)	-----						
LEGAL	0.077	-0.178**	1.000					
	(0.33)	(0.02)	-----					
DF	-0.123	-0.437***	0.684***	1.000				
	(0.12)	(0.00)	(0.00)	-----				
DN	-0.280***	-0.309***	0.479***	0.431***	1.000			
	(0.00)	(0.00)	(0.00)	(0.00)	-----			
TR	0.281***	0.012	0.675***	0.361***	0.294***	1.0000		
	(0.00)	(0.88)	(0.00)	(0.00)	(0.00)	-----		
WE	0.187**	0.010	0.210***	0.027	0.219***	0.673***	1.000	
	(0.02)	(0.89)	(0.00)	(0.73)	(0.00)	(0.00)	-----	
WN	-0.315***	-0.039	-0.498***	-0.289***	-0.025	-0.614***	-0.055	1.000
	(0.00)	(0.62)	(0.00)	(0.00)	(0.75)	(0.00)	(0.49)	-----

P-values are reported in parenthesis. ***, **, * denote statistical significance at the 1%, 5% and 10% level. DF = Enforcing contracts index. DN = Strength of legal rights index. TR = Resolving insolvency index. WE = Strength of insolvency framework index. WN = Time to resolve insolvency (years). LEGAL = Rule of law. BR = Bank branches per 100,000 adults. ATM = ATMs per 100,000 adults.

4.2.3. Non-European countries

Only the statistically significant correlation results are interpreted. In table 6, the ATM variable is positively correlated with the DF, TR, WE and WN variables. However, only the TR, WE and WN variables are positively significant, implying that there is greater number of ATM supply in non-European countries that have strong frameworks for insolvency resolution and a shorter time to insolvency resolution. Meanwhile, ATM is significant and negatively correlated with the LEGAL and DN variables, implying that there is greater ATM supply in non-European countries that have weak rule of law and legal rights. On the other hand, the BR variable is negatively correlated with the DF, TR, WE and WN variables. However, only the TR, WE and WN variables are significant, implying that there is greater number of bank branches in non-European countries that have weak contract enforcement, weak frameworks for insolvency resolution, and shorter time for insolvency resolution. Meanwhile, BR is significant and positively correlated with the LEGAL and DN variables, implying that there is greater number of bank branches in non-European countries that have strong rule of law and legal rights.

Table 6: Non-European countries (Pearson correlation results)

Variables	**ATM**	**BR**	LEGAL	DF	DN	TR	WE	WN
ATM	**1.000**							

BR	**-0.906*** **	**1.000**						
	(0.00)	**-----**						
LEGAL	**-0.7156*** **	**0.840*** **	1.000					
	(0.00)	**(0.00)**	-----					
DF	0.065	-0.129	-0.634***	1.000				
	(0.76)	(0.55)	(0.00)	-----				
DN	**-0.913*** **	**0.984*** **	0.744***	0.031	1.000			
	(0.00)	**(0.00)**	(0.00)	(0.88)	-----			
TR	**0.819*** **	**-0.883*** **	-0.573***	-0.219	-0.924***	1.000		
	(0.00)	**(0.00)**	(0.00)	(0.31)	(0.00)	-----		
WE	**0.772*** **	**-0.889*** **	-0.955***	0.482**	-0.817***	0.740***	1.000	
	(0.00)	**(0.00)**	(0.00)	(0.01)	(0.00)	(0.00)	-----	
WN	**0.585*** **	**-0.694*** **	-0.966***	0.801***	-0.570***	0.369*	0.884***	1.000000
	(0.00)	**(0.00)**	(0.00)	(0.00)	(0.00)	(0.08)	(0.000)	-----

P-values are reported in parenthesis. ***, **, * denote statistical significance at the 1%, 5% and 10% level. DF = Enforcing contracts index. DN = Strength of legal rights index. TR = Resolving insolvency index. WE = Strength of insolvency framework index. WN = Time to resolve insolvency (years). LEGAL = Rule of law. BR = Bank branches per 100,000 adults. ATM = ATMs per 100,000 adults.

4.3. Pre, during- and post- global financial crisis correlations

Next, I check whether the events before, during and after the 2007/2008 global financial crisis have any significant effect on the correlation between financial inclusion and legal system quality.

The full sample was divided into three subsamples to capture the effect of the pre-, during- and post- global financial crisis on the correlation between financial inclusion and legal system quality. The pre-financial crisis subsample contains data for all the variables from 2004 to 2006. The post- financial crisis subsample contains data for all the variables from 2009 to 2012, while data for all the variables from 2007 to 2008 captures the period during the global financial crisis.

4.3.1. Pre-financial crisis correlation

The results are reported in table 7. Only the statistically significant correlation results are interpreted. The ATM variable is significant and positively correlated with the TR variable and negatively correlated with WN. This implies that greater number of ATM supply is correlated with strong insolvency resolution and shorter time to resolve insolvency in the pre- financial crisis period.

On the other hand, the BR variable is significant and negatively correlated with the DF variable, implying that there is a negative correlation between the number of bank branches (BR) and contract enforcement (DF) in the pre- financial crisis period.

Table 7: Pre-financial crisis 2004-2006 (Pearson correlation results)

Variable	ATM	BR	LEGAL	DF	DN	TR	WE	WN
ATM	1.000							

BR	0.308**	1.000						
	(0.03)	-----						
LEGAL	0.210	-0.062	1.000					
	(0.15)	(0.67)	-----					
DF	0.155	-0.402***	0.618***	1.000				
	(0.29)	(0.00)	(0.00)	-----				
DN	-0.025	-0.239	0.413***	0.397***	1.000			
	(0.86)	(0.10)	(0.00)	(0.00)	-----			
TR	0.429***	0.029	0.655***	0.367**	0.317**	1.000		
	(0.00)	(0.84)	(0.00)	(0.01)	(0.03)	-----		
WE	0.046	-0.178	0.263*	0.133	0.379***	0.662***	1.000	
	(0.75)	(0.23)	(0.07)	(0.37)	(0.00)	(0.00)	-----	
WN	-0.410***	-0.081	-0.409***	-0.229	0.045	-0.597***	-0.069	1.000
	(0.00)	(0.58)	(0.00)	(0.12)	(0.76)	(0.00)	(0.64)	-----

P-values are reported in parenthesis. ***, **, * denote statistical significance at the 1%, 5% and 10% level. DF = Enforcing contracts index. DN = Strength of legal rights index. TR = Resolving insolvency index. WE = Strength of insolvency framework index. WN = Time to resolve insolvency (years). LEGAL = Rule of law. BR = Bank branches per 100,000 adults. ATM = ATMs per 100,000 adults

4.3.2. During the global financial crisis

The results are reported in table 8. Only the statistically significant correlation results are interpreted. The ATM variable is significant and positively correlated with the TR variable and negatively correlated with WN, implying that greater number of ATM supply is correlated with strong insolvency resolution and shorter time to resolve insolvency during the global financial crisis. On the other hand, the BR variable is significant and negatively correlated with the DF and DN variables, implying that higher number of bank branches (BR) is correlated with weak contract enforcement (DF) and weak legal rights (DN) during the financial crisis.

Table 8: During financial crisis 2007-2008 (Pearson correlation results)

Variable	ATM	BR	LEGAL	DF	DN	TR	WE	WN
ATM	1.000							

BR	0.259*	1.000						
	(0.06)	-----						
LEGAL	0.135	-0.136	1.000					
	(0.34)	(0.34)	-----					
DF	0.050	-0.435***	0.615***	1.000				
	(0.72)	(0.00)	(0.00)	-----				
DN	-0.090	-0.284**	0.488***	0.449***	1.000			
	(0.53)	(0.04)	(0.00)	(0.00)	-----			
TR	0.375***	-0.006	0.621***	0.363***	0.317**	1.000		
	(0.00)	(0.96)	(0.00)	(0.00)	(0.02)	-----		
WE	0.097	-0.032	0.170	0.086	0.298**	0.695***	1.000	
	(0.49)	(0.82)	(0.23)	(0.55)	(0.03)	(0.00)	-----	
WN	-0.376***	-0.043	-0.481***	-0.274*	-0.029	-0.613***	-0.067	1.000
	(0.00)	(0.76)	(0.00)	(0.05)	(0.83)	(0.00)	(0.64)	-----

P-values are reported in parenthesis. ***, **, * denote statistical significance at the 1%, 5% and 10% level. DF = Enforcing contracts index. DN = Strength of legal rights index. TR = Resolving insolvency index. WE = Strength of insolvency framework index. WN = Time to resolve insolvency (years). LEGAL = Rule of law. BR = Bank branches per 100,000 adults. ATM = ATMs per 100,000 adults.

4.3.3. Post financial crisis

The results are reported in table 9. Only the statistically significant correlation results are interpreted. The ATM variable is significant and positively correlated with the TR variable and negatively correlated with WN, implying that greater number of ATM supply is correlated with strong insolvency resolution and shorter time to resolve insolvency in the post financial crisis period.

On the other hand, the BR variable is significant and negatively correlated with the LEGAL, DF and DN variables, implying that higher number of bank branches (BR) is correlated with weak rule of law, weak contract enforcement (DF) and weak legal rights (DN) in the post financial crisis period.

Table 9: During financial crisis 2009-2012 (Pearson correlation results)

Variable	ATM	BR	LEGAL	DF	DN	TR	WE	WN
ATM	1.000							

BR	0.235**	1.000						
	(0.01)	-----						
LEGAL	0.054	-0.213**	1.000					
	(0.59)	(0.03)	-----					
DF	0.093	-0.468***	0.623***	1.000				
	(0.35)	(0.00)	(0.00)	-----				
DN	-0.127	-0.311***	0.522***	0.433***	1.000			
	(0.20)	(0.00)	(0.00)	(0.00)	-----			
TR	0.289***	-0.077	0.683***	0.395***	0.291***	1.000		
	(0.00)	(0.44)	(0.00)	(0.00)	(0.00)	-----		
WE	0.035	0.043	0.124	-0.038	0.042	0.565***	1.000	
	(0.72)	(0.66)	(0.21)	(0.70)	(0.67)	(0.00)	-----	
WN	-0.316***	0.041	-0.590***	-0.360***	-0.134	-0.644***	0.096	1.000
	(0.00)	(0.68)	(0.00)	(0.00)	(0.18)	(0.00)	(0.33)	-----

P-values are reported in parenthesis. ***, **, * denote statistical significance at the 1%, 5% and 10% level. DF = Enforcing contracts index. DN = Strength of legal rights index. TR = Resolving insolvency index. WE = Strength of insolvency framework index. WN = Time to resolve insolvency (years). LEGAL = Rule of law. BR = Bank branches per 100,000 adults. ATM = ATMs per 100,000 adults.

5. Conclusion

This study investigated the correlation between financial inclusion and legal system quality for 27 developed countries from 2004 to 2012. I also examined the correlation between financial inclusion and legal system quality at the subsample level, as well as the effect of the global financial crisis on the correlation between financial inclusion and legal system quality.

I find evidence for a significant positive correlation between financial inclusion and legal system quality. More specifically, greater ATM supply is correlation with stronger insolvency resolution. In the regional correlation analysis, the findings show that higher number of ATM per 100,000

adults is correlated with stronger insolvency resolution among G7, European and non-European countries. Also, higher number of bank branch per 100,000 adults is correlated with strong rule of law and legal rights in non-European countries. Furthermore, in the financial crisis correlation analyses, the findings show that financial inclusion, measured as the number of ATMs per 100,000 adults, is positively correlated with strength of insolvency resolution and negatively correlated with the time to resolve insolvency before, during and after the global financial crisis. Also, financial inclusion, measured by the number of bank branch per 100,000 adults, is negatively correlated with the strength of contract enforcement in the pre, during- and post financial crisis period.

The implication of the observed positive correlation between financial inclusion and legal system quality is that financial inclusion objectives and legal system quality are complements in improving development outcomes. The complementary benefits can help to ensure that formal finance is not only accessible to all members of society, but also ensure that users of formal finance have the legal protection they need to protect them from being exploited by providers of formal financial services. Law makers should find innovative ways to strengthen existing legal institutions to preserve the people in society while financial authorities should ensure that formal financial services are accessible to all members of society and ensure that providers of financial services comply with existing laws that protect customers in the formal financial sector.

Future studies can re-examine the correlation between financial inclusion and legal system quality in developing countries. Secondly, future studies can also extend the analysis to Middle East and North African (MENA) countries where religiosity dominates the law making process. Future studies should determine the effect of religiosity on the correlation between legal system and financial inclusion. Thirdly, it will be interesting to investigate the cause-and-effect relationship between financial inclusion and environmental sustainability while taking into account any potential endogeneity that may arise from such investigation. Finally, future studies can examine the correlation between financial inclusion and legal system quality using more recent data when such data becomes available.

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