Credit Disbursal, Growth and Procedural Law: Evidence from India[1]

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Abstract

Law and Finance literature shows that effective creditor and investor protection lead to vibrant financial markets. In this paper, we argue that supporting laws that lead to swift enforcement and reduce the cost of availing legal services would help implement the law effectively. This paper analyses the causal relationship between the procedural law and credit in India using both macro and micro econometric techniques. Using newly constructed time series index of procedural innovations in the law in India, this paper tries to identify the direction of causality and also explore the possible channels of impact in the Indian context. The results suggest that there is a long run causal relationship between law and finance, and the channel of impact is debt accumulation rather than total factor productivity. At a micro-level, using the staggered introduction of the Debt Recovery Tribunals (DRTs), a fast track court for financial disputes involving banks, we show that the procedural law innovation in India, has resulted in higher disbursal of loans to the private sector by the banks.

Key words: Law and Finance, Economic Growth, Enforcement of Law, Granger causality and Difference in Difference Approach

JEL Classification: O16, K42, C32

I. Introduction

Recent development in Law and Finance literature emphasize the importance of effective Law, especially creditor and investor protection, for the functioning of debt and stock markets (La Porta et al. 1997; Jappelli and Pagano 2002; Djankov 2003, 2006). Well developed legal institutions would reduce the informational asymmetry and increase the expected return from the perspective of the lender and thereby enhance the availability of external funds in the economy. In a series of empirical studies La Porta et. al. (1997, 1998 and 1999) showed that shareholder and creditor rights are correlated with higher private sector lending measured by total private sector lending divided by GDP in a cross country set up.

Although the evidence shows that the quality of substantive law and judicial enforcement is weak in most of the developing countries, India, a common law country, has developed the substantive law on par with most of the developed countries. However, India emerges as an outlier in cross country regressions which use an index of substantive law on books as a measure of investor protection with a strong property rights regime but a relatively underdeveloped financial system. This result is paradoxical if one assumes that the law on books is implemented efficiently. However a number of country specific studies show that the Law on books is not enforced efficiently and thus forms an impediment in creating the right incentives for efficient transfer of savings into productive investment: In Argentina, the quality of judicial enforcement is correlated with higher lending to corporate sector (Cristini, Moya and Powell, 1999). On the other hand, in Italy (Bianco, Jappelli and Pagano (2004), show that poor enforcement measured by the trial backlog led to a credit squeeze. Fabbri and Padula (2004) makes use of trial– disposal ratio to show that judicial inefficiency is correlated with the availability of external finance and banks' lending rates in Spain. Further, Clague *et al* (1999), in a cross country set up, show that a strong third party enforcement reflected by high ratios of "contract intensive" money to GDP is correlated with higher growth. A number of studies, in the context of housing loans and mortgages, show that weak foreclosure process is associated with higher interest rates and debt volume (Meador, 1982; Gropp, Sholz and White, 1997). A sluggish legal system increases the bounty on opportunistic behavior and discourages the creditors from lending in the first stage (Bianco et al, 2004).

There are two observations that are of relevance: The first is that "enforcement" of creditor and investor protection is measured by the index of how quickly the judicial system can bring about a redressal of cases where there is a default. Secondly, in most of the studies it is the substantive Law on books that measures investor protection. The case specific studies referred to above concentrate on the efficiency of disposal of cases and not on the *supportive laws* that go into the making the substantive law *operational*.

In this paper, we maintain that supporting laws, which help in implementation of general laws in a manner that minimize the costs of implementation, are needed for efficient implementation. For example, from the developing country perspective, any procedural development that reduces the cost of availing legal services and swift contract enforcement would help in enforcing the institution of property rights protection, and, in particular, creditor and investor protection. Such supporting laws improve investor/ creditor confidence in the system and increase the total credit advanced in a credit constrained economy. Thus, a good substantive law which is in the interest of the creditors and *ancillary procedures* that help in the swift enforcement of the law on books would lead to a lowering of the risks associated with lending and lead to higher external finance.

The pertinent question is what are the reasons that make the recovery of debt a slow process in India? The standard reasons given in the literature refer to a supply constraint from the judicial apparatus. In this paper we maintain that there can be other constraints in form of a lack of or inefficient *procedural laws* that exacerbate such bottlenecks and act as impediments in creating the right incentives to lending behaviour. Debt default was widespread as the *procedure to recover* bad debt was a fairly difficult process due to the possibility of numerous appeals under Code of Civil Procedure (1908) and about 40% of debt recovery cases were pending for more than 8 years in various civil courts due to court delay (Law Commission of India 1988). Escalated time and cost of recovery of bad debts due to formalism and court delay made private sector lending unattractive and consequently Indian banks had invested more than the stipulated proportion in risk free government bonds (Banerjee *et al,* 2003). It is well known that there have been a number of changes/ developments in India pertaining to laws on debt recovery. Such support structures take the form of *procedural law* rather than the substantive laws. However, the dynamic relationship between legal changes in procedural law and the

lending behavior of the participants in the credit market is not well documented in the context of developing countries especially in the Indian context.

This paper analyses the relationship between law and credit in India, both from a macroeconomic perspective using time series data and from a microeconomic perspective using bank level panel data. Though a number of macroeconomic time series studies show that the causal relationship between credit dispersal and economic growth is country specific (Demetriades and Hussein, 1997), the relationship between legal apparatus, credit availability and economic growth is not well explored. We construct an index to capture the provisional innovations in the law in India pertaining to financial sector that make enforcement quicker and reduce the costs of using the legal system. The main focus of macro analysis is twofold: first, to establish a positive long run relationship between finance and economic growth with meaningful measures of financial development and, second, to identify the direction of causality. Modern multivariate time series techniques such as Johansen's cointegration techniques and a number of Granger Causality tests are employed to test long run causal relationship between law, credit and economic growth. Past literature show that channels of impact of finance and growth are investment and capital formation rather than savings (Sahoo et al, 2001) and productivity (Beck et al, 2001). In this paper we try to analyze the possible channels of impact in the Indian context in the light of legal development.

At the Micro-level, we show that a procedural law innovation in India, the Debt Recovery Tribunals (DRTs) for faster redress of financial disputes involving banks, has resulted in higher disbursal of loans to the private sector by the banks using bank level panel data. We make use of the staggered introduction of DRTs to capture the causal effect of procedural innovation on the lending behavior of banks that were exposed to DRT (treatment group) vis-à-vis the banks that were not (control group) as the decision to give DRT to a particular state was not systematic.

The paper proceeds as follows: the second section gives a detailed account of data and methodology for constructing the indices mentioned above. Econometric methodology is given in the section three. The results are discussed in section five and conclusion follows.

II. Data & Methodology for Causality Tests

Private credit (CR) taken from Financial Structure database, which is the ratio of bank credit to the private sector to nominal GDP has been proved to be one of the better measures of financial sector development in the literature (Levine, 2005). Private credit excludes credits issued by the central bank and banks' loans to the government. This captures the importance of the intermediary sector in the system by the extent of its usefulness in transferring the resources to their most productive use.

Following standard practice, real GDP per capita (PGDP) is used as our measure for economic development (King and Levine, 1993a, b; Demetriades and Hussein, 1996 and others). All conventional measures of financial sector such as M2, credit to private sector, nominal and real GDP, Per capita gross domestic savings (PGDS), per capita gross domestic fixed investment (PGDFI), per capita gross domestic fixed capital formation (PGDFC) and the measure of trade openness (OPEN) are taken from National Accounts Statistics of India: 1950–51 to 2003-04 provided by EPW research foundation. Total factor productivity (TFP) is computed using conventional growth accounting[3]. All variables are quoted in local currency if not mentioned specifically. The data are converted into natural logarithms so that they can be interpreted in growth terms after taking the first difference.

A) Index of Procedural Law and Enforcement (LD)

As argued at the outset, our index of procedural law and enforcement (LD) contains those provisions in law and regulatory reforms that matter for the speed and the quality of redress. The index gets a value of one if a specialized board or tribunal is constituted to resolve insolvency and debt recovery matters for the period 1960 to 2006. We believe that a specialized forum to deal with these matters would have an advantage over overburdened courts in speeding up the process.

[3] $Y_t = A_0 e^{bt} K_t^{\alpha} L_t^{(1-\alpha)}$ is the conventional aggregate production function where *Y* is real GDP, *K* is capital stock, *L* is total employment and $A_0 e^{bt}$ is technological progress. Dividing both the sides by L and taking the natural logarithms gives the following linier equation that could be empirically tested. $y_t = a + b_t + \alpha k_t$ where the lower case letters indicate log terms and a in the regression is the measure total factor productivity.

The Companies Act (1956) required creditors to file a case in the High Courts for proceedings such as liquidation of companies. The Companies Act was constantly amended[4]. The first reform was to constitute Company Law Board[5] (CLB) with the consolidated power under The Companies Act, 1956, Securities Contracts (regulation) Act, 1956, MRTP Act, 1969 and Code of Civil Procedure, 1908. A special tribunal, Board for Industrial and Financial Reconstruction (BIFR) was constituted for revival and rehabilitation of companies under Sick Industrial Companies (Special Provisions) Act, 1985 (SICA) in 1989. It was expected that by expediting the process of revival, idle investment in the sick units could be released for more productive use in the hands of creditors. A capital markets regulator, Securities Exchange Board of India (SEBI) was constituted in 1993 to police capital market transactions. To overcome cumbersome provisions of the Companies Act (1956) and the Code of Civil Procedure (1908), Debt Recovery Tribunals (DRTs) were set up in order to expedite the debt due to banks and financial institutions. DRTs made private sector lending more profitable to the banks by quickening the process of redress in case of default (Visaria, 2006). The Securitization and Reconstruction of Financial Assets and Enforcement of Security Interests Act (SRFAESI Act) has made further reforms in debt recovery by allowing the lenders to use DRTs to recover non-performing assets (NPAs) depending on the size of the disputed amount. As reconstruction, rehabilitation and winding up of Companies are dealt by various authorities National Company Law Tribunal was constituted under The Companies (Amendment) Act 2002 to consolidate and minimize overlapping jurisdiction. Pending matters in High Courts, CLB and BIFR are transferred to NCLT.

These innovations, which aimed to speed up dispute redress related to debt matters, would reduce the resources spent on enforcing financial contracts. This time series index of procedural law and enforcement shows a dramatic increase in the 1990's which coincides with the period of fastest financial sector development in India.

Econometric Methodology

[4] Concept paper on the Companies Amendment Act (2002) states that the Companies Act, 1956 was amended 24 times since its inception. The major amendments include Companies (Amendment) Act, 1988 based on Sachar Committee recommendations and Companies (Amendment) Act 2002 based on Eradi Committee recommendations.

[5] See section 4 of the Companies (Amendment) Act (LIII of 1963).

To start with, cointegration technique is combined with the unrestricted multivariate VAR model to identify the long-run equilibrium relationship between the variables of interest. Further, a number of causality tests are employed to identify the causal relationship between law, finance and economic growth in India. This section briefly reviews the empirical techniques used.

Identifying Long Run Relationship

Based on law and finance theory it is hypothesized that there exist a long run equilibrium relationship between law, finance and growth. Cointegration techniques can be used to establish long-run equilibrium or stationary relationship between non-stationary variables. This combined with the vector error correction models (VECM) can capture both the short-term and long-term dynamics in a given relationship. In addition, the channels that law and finance operate to influence economic growth is analyzed in this subsection.

To identify long run relationship between the variables of interest the following procedure is used. First, unit root tests are used as Johansen's cointegrating technique and VECM require the variables to be unit roots i.e. should be integrated of first order. Further, VAR-based cointegration test developed in Johansen (1991, 1995) are utilized to test for cointegrating relationships.

Test for Order of Integration

A number of unit root tests such as Generalized Least Square Dickey - Fuller (GLSDF) are utilized to examine the order of integration of all the variables in the system[6]. GLSDF of Elliott, Rothenberg, and Stock (1996), a variant of ADF test, tests for a unit root by a prior de-trending (de-meaning) of the data with a GLS technique and substituting the detrended variable into the ADF test. This test is said to posses more power as it is more robust than those based on DF (Elliott *et al.*, 1996).

As the structure of the system and the output critically depend on the lags chosen to estimate the VAR and VECM, there are a number of criteria proposed in the literature such as

[6] One of the major shortcomings of unit root tests based on Dickey–Fuller method is that they invariably fail to reject near unit root processes in favor of unit roots. This process names as "long memory" or fractional integration do have serious implications on Johansen's cointegration results (Gonzalo and Lee 1998). To overcome this problem we use a test proposed by KPSS (Kwiatkowski, Phillips, Schmidt and Shin, 1992) that tests a null hypothesis of stationarity, or I(0), vis-à-vis I(1) of Dickey–Fuller tests.

multivariate forms of Schwartz Information Criteria, Akaike Information Criteria (AIC). AIC is the criterion used to arrive at the optimal lag for the proposed models.

Johansen's Cointegration Procedure

An unrestricted VAR is specified as a base model for the analysis.

$$Z_t = A_0 D_t + A_1 Z_{t-1} + A_2 Z_{t-2} + \Lambda + A_k Z_{t-k} + \in_t, \qquad (1)$$

Where A_i's are (n×n) matrix of parameters, Z is an (n×1) vector containing all n variables in the system (i.e. CR, LD, PGDP, INDUS / MANUF, PGDS / PGDFI / PGDFC / OPEN / FP), D is a vector of all deterministic terms (intercept, trend, dummies, etc), and $\in_t$ is an (n × 1) vector of white noise error terms.

This unrestricted base VAR could be represented as a Vector Error Correction Model if it is reparameterized as

$$\Delta Z_t = A_0 D_t + \prod Z_{t-1} + \Gamma_1 \Delta Z_{t-1} + \Gamma_2 \Delta Z_{t-2} + \mathrm{L} + \Gamma_{k-1} \Delta Z_{t-k+1} + \in_t . \qquad (2)$$

A vector error correction (VEC) specification consists of the vector of first differenced variables as a function of own and other variables' first differenced lagged values, a vector of constant terms and an error correction term. The system consists of variables that are I(1) difference stationary, where Z_t = [CR_t, LD_t, $PGDP_t$, $INDUST_t$ / $MANUF_t$, $PGDS_t$, / $PGDFI_t$ / $PGDFC_t$ / $OPEN_t$ / TFP_t]/, and ΔZ_t = [ΔCR_t, ΔLD_t, $\Delta PGDP_t$, $\Delta INDUST_t$, / $\Delta MANUF_t$, $\Delta PGDS_t$, / $\Delta PGDFI_t$ / $\Delta PGDFC_t$ / $\Delta OPEN_t$ / ΔTFP_t]/. D is an (n × 1) vector of deterministic matrix that contains the constants and dummy variables introduced in the system. $\in_t$ is an (n × 1) vector of white noise error terms. $\Gamma_j \Delta Z_{t-j}$ is the first differenced component in the VAR system, where Γ_j is an (n × n) matrix of short term adjustment coefficients associated with the lagged values of variables in the system Z_t. ΠZ_{t-p} is the error-correction component, where Π is an (n × n) matrix of cointegrating parameters which characterize the long run relationship among the variables and long run adjustment coefficients in the VEC system. Thus Π consists of n×r dimension matrices α and β, where $\Pi = \alpha\beta^{/.}$

The rank of $\prod$ matrix indicates the number of possible cointegrating relationship i.e. long run equilibrium relationship among the variables in the system. If the $\prod$ matrix has full rank then

all the variables in the system are stationary and the error correction mechanism does not exists. If the rank of $\prod$ matrix is zero the short-term dynamics depends only on lagged changes in all variables. The rank of Π can be determined by λ_{trace} or λ_{max} test statistics. The existence of co-integration between the two variables suggests the presence of causality between the variables in at least one direction (Engle and Granger, 1987).

Causality tests

The idea of understanding causality, an indication of controllability of a variable given its cause, makes it important for any policy analysis. There are two broad strategies to identify causality namely the bottom up strategy popularized by Granger (1969) where the series are assumed to be independently generated and tested to see if they are related to each other, whereas in top down strategy the series tested to see if they are independent[7] (Kirchgässner and Wolters, 2007).

Causality: Bottom up Approach

Modern concept of causality in economics was introduced by Wiener (1956) and Granger (1969). Granger-causality is in fact incremental predictability[8] between two time series variable i.e. examines whether knowing the current and lagged values of x, besides all other available information, improves the forecasts of the future values of y[9].

a) Simple Bivariate Granger Procedure

Sargent (1976) has proposed a simple procedure called the direct Granger procedure for testing causality. Consider two stationary variables Y and X for which the regression equations are

[7] There exists an alternate approach to causality that explores what would happen to Y if X had not happened. However, the problem is that counterfactuals involve situations that cannot be observed and used only in experimental sciences.

[8] To define incremental predictability let us assume two weakly stationary series Y and X and I_t the information set. Let $\overline{X_t}$ be the set of all current and past values of X i.e. $\overline{X_t} = \{x_t, x_{t-1}, ..., x_{t-k}, ...\}$ and $\overline{Y_t}$ be set of all current and past values of Y and $\sigma^2(.)$ be the corresponding forecast error. X is said to Granger cause Y if and only if $\sigma^2\left\langle Y_{t+1} \middle| I_t \right\rangle < \sigma^2\left\langle Y_{t+1} \middle| I_t - \overline{X} \right\rangle$ i.e. the future values of Y can be predicted with a better precision if the past values of X are available.

[9] Even though causality necessarily implies predictability, the reverse does not hold. However, causality defined just as incremental predictability is most prevalently used in econometrics (Kirchgässner and Wolters, 2007).

$$Y_t = \sum_{i=1}^{p} \alpha_i Y_{t-1} + \sum_{i=1}^{p} \beta_i X_{t-1} + u_t$$

$$X_t = \sum_{i=1}^{p} \delta_i Y_{t-1} + \sum_{i=1}^{p} \gamma_i X_{t-1} + v_t$$

To test whether X Granger causes Y a Wald test is used to test whether all the lagged values of X in the Y equation are simultaneously equal to zero. X Granger causes Y if $\sum \beta \neq 0$ and, if both $\sum \delta \neq 0$ and $\sum \beta \neq 0$, then there exists a bidirectional causality between Y and X.

b) Simple Granger Causality in a trivariate Model

The simple Granger procedure could be extended as it is implausible to assume that no third variable would affect the variables under consideration. If the information set I_t contains the past information of a third variable Z besides $\overline{X_t}$ and $\overline{Y_t}$, a null hypothesis of X does not cause Y conditional on Z could be tested with a Wald test in a model where Y depends on lagged values of Y and Z. For example, whether financial development Granger causes economic growth conditional on the developments in procedural law could be tested by a Wald test on the lagged values of legal development in a regression of economic growth on the lagged values of financial development and legal development. [See, for example, Stock and Watson (1989)]

Causality: Top down Approach

As discussed at the onset, Wald tests could be used for testing causality in a VAR or VEC set up in a number of ways. Causality within VAR models is tested depending on the pre-testing for unit roots and cointegration. When the series are stationary then a VAR model in levels is constructed. If the variables are difference stationary or integrated of the order one I(1), the VAR is specified in first difference. If the series are cointegrated then vector error correction (VECM) models are used[10]. Alternatively, a modified Wald test for causality using SUR system proposed by Toda and Yamamoto (1995) is used.

a) Granger Causality/Block Exogeneity Wald Test in VAR

[10] However, the drawback of this approach is that incorrect conclusions drawn from preliminary analyses such as unit-root and cointegration test might be carried over onto the causality tests.

Sims, Stock, and Watson (1990) and further Toda and Phillips (1993) show that when the variables are cointegrated of order 1, Wald tests of Granger non-causality in levels VAR could be used based on the error correction model. The Wald tests are valid asymptotically if there I sufficient cointegration among the variables. This procedure called the sequential Wald tests are shown to have good properties across a number of specifications (Toda and Phillips, 1993). As Granger representation theorem suggests if the variables are cointegrated then there must be a causal relationship among them running at least in one direction, a pair wise Granger causality and Block Exogeneity Wald test for zero restrictions on the coefficients on the VAR or VEC model are employed.

In addition to the real GDP per capita and the financial development indicator, a third variable is introduced in our VAR system, such as index of legal (LD) and regulatory developments (FR). Due to data inadequacy, a trivariate VAR is the preferred technique to assess the impact of legal, institutional and financial repression independent of one another on financial sector development and economic growth. In addition, the Wald tests for block exclusion/ Granger causality in trivariate VAR with a single cointegrating relationship is valid (Sims et al. 1990) and are non-standard in higher dimensional systems (Toda and Phillips, 1993).

b) Toda & Yamamoto Modified Wald Test for Causality

Alternatively Toda and Yamamoto (1995) and Dalado and Lutkepohl (1996) have proposed a modified Wald test for causality on an augmented VAR in levels. This procedure intentionally over-fits the model with additional lags so that the resulting VAR has the order of $p = k + d$, where k is the optimal lag order irrespective of the order of integration and cointegration. Conventional Wald tests could be applied to the first k coefficient matrices using the standard χ^2 statistics, which is free of the problem of invalid asymptotic properties of Wald tests in the presence of non-stationary series[11]. Swanton et al (2001) show that modified Wald test performs well irrespective of the cointegration properties, whereas the sequential Wald tests due Toda and Phillips (1993, 1994) performs well in cointegrated data.

Further, the power of the test improves when Seemingly Unrelated Regression (SUR) models are used for the estimation (Rambaldi and Doran, 1996). Although the redundant regressors

[11] Swanson et al (2001) provides the reason, "all nonstandard asymptotics are essentially confined to the coefficient matrices beyond the correct lag order, and standard asymptotics apply with respect to the coefficient matrices up to the correct lag order."

used in the test may lead to losses in power and efficiency in small samples, this procedure is applied to validate the results obtained from conventional approaches.

III. Results and Interpretation

Identifying Long Run Relationship between Law, Finance and Growth and the Channels of Impact

Unit Root Test Results

All the variables introduced in the system should be integrated of same order for cointegration to exist. Though a number of unit root tests are suggested in the literature, Generalized Least Square Dickey - Fuller (GLSDF) is employed for the reasons discussed above. All the variables are in log form.

Table 2: Unit Root Test Results

Variables	Dickey-Fuller In levels		Dickey-Fuller Differenced series	
	Constant only	Constant and trend	Constant only	Constant and trend
PGDP	3.46*	-0.14	-5.72*	-7.39*
CR	-0.29	-0.96	-4.13*	-4.07*
LD	-1.16	-2.10	-6.74*	-6.68*
PGDS	-1.28	-1.66	-3.11*	-4.59*
PGDFI	-1.59	-1.93	-5.42*	-6.09*
PGDFC	1.67**	-1.11	-2.82*	-3.59**
OPEN	0.68	-1.37	-2.21**	-3.25**
TFP	-3.95*	-4.16*	-6.56*	-6.72*

1 Elliott-Rothenberg-Stock DF-GLS test statistic where the null hypothesis is the variable is non-stationary; critical values from MacKinnon (1996).
* Significant at 1% level (-2.63 for constant only and –3.77 for constant and trend specification)
**5% level (-1.95 for constant only and –3.19 for constant and trend specification)
***10% level (-1.61 for constant only and –2.89 for constant and trend specification)

Both constant only and with constant and trend specification of unit roots tests are tried. The results show that all the variables are integrated of order one and stationary upon differencing except PGDP and PGDFC which does not have unit root at levels in constant only specification. An alternative test proposed by KPSS is tried out to diagnose the consistency of

these results[12]. KPSS test results show that both PGDP and PGDFC have unit toot and confirm the results of GLSDF test for other variables.

Cointegration Test Results

Of three measures of financial sector development, the private sector credit given out by the banks (CD) is used for this long run analysis. The index of procedural law development (LD) is used as a measure of legal development. All the three measures of aggregate economic activity namely pre capita GDP (PGDP), size of industry in GDP (INDUST) and size of manufacturing sector (MANUFACT) are used individually. The Per capita gross domestic savings (PGDS), per capita gross domestic fixed investment (PGDFI), per capita gross domestic fixed capital formation (PGDFC), a measure of trade openness (OPEN) and total factor productivity (TFP) are the possible channels introduced in the model individually. Thus, each model will have one of the indicators of economic activity, measure of financial sector development (CD), index of procedural law development (LD) and one of the channels. Along with the variables of interest a dummy for bank nationalization in 1969 and economic liberalization in 1991 were introduced to control for external shocks to the system.

From the received empirical literature, it is expected that savings (Sahoo, Nataraj and Kamaiah, 2001) and total factor productivity (Beck, Levine, and Loayza, 2000) would not be associated with equilibrium growth. Whereas investment (Saggar, 2003), capital accumulation (Beck, Levine, and Loayza, 2000) and openness (Bahmani-Oskooee and Niroomand, 1999) would be the channels that associate finance with economic growth in the long run.

All the variables introduced in the model are nonstationary in levels and stationary upon differencing once except TFP that is stationary in level. Johansen cointegration technique[13] proposed in Johansen (1988, 1991) and Johansen and Juselius (1995) is used to determine the cointegration rank *r*, cointegrating vector β and the adjustment parameters α. Cointegration test results are given in the table 1. In most of the cases, the null hypothesis of no cointegrating

[12] The results are available with the author.

[13] Since Johansen cointegration technique require all the variables to be integrated of order one, we use an alternate technique proposed by Peasaran et al. () to identify the cointegrating relationship in the models involving TFP.

vector is rejected in favor of the alternative of at least the existence of one cointegrating vector. Identifying single cointegrating equation has a nice economic interpretation that all the variables in the system move together towards a long-run equilibrium.

The model description are given in the left hand side of the table 1 where a model that is normalized on the variable Y is denote by F_Y (Y | X, Z, W). The unrestricted estimates for the cointegrating vector β and the feedback adjustment coefficients α are given with the standard errors. Further, the cointegration rank and trace statistic are produced in the right hand side of the table 1. β coefficients capture the cointegrating relationship amongst variables in system and the α is the speed of adjustment of a variable towards the long-run cointegrating equilibrium. The speed of adjustment parameter is expected to be negative since a variable will increase to move back towards the long-run equilibrium if it is lower than the level implied by the long-run equilibrium.

Normalizing the cointegrating equation would help estimate the long run elasticity of variables in the model i.e. cointegrating equation normalized for financial sector indicator can be interpreted as the demand for finance and a negative sign for PGDP in the finance equation would mean increase in economic activity measured by PGDP increases the demand for financial sector.

The first model in the table 1, PGDP is normalized where the coefficients of private credit (CR) and procedural law development (LD) have the expected negative sign implying that there is a long run positive association between these variables and economics growth. The coefficients could be interpreted as long run elasticity of output with respect to changes in CR and LD. The speed of adjustment coefficients are statistically significant and have the negative sign that is consistent with long run equilibrating behavior identified. However, savings (PGDS) has unexpected sign and insignificant adjustment coefficient.

The second model normalized for PGDP where fixed investment (PGDFI), CR and LD have expected sign. Similarly, in the subsequent models capital formation (PGDFC), openness (OPEN) and total factor productivity (TFP) are introduced where only PGDFC has a positive long run relationship with economic growth. Both CR and LD have positive and significant

relationship with economic growth irrespective of the channel of impact. Further, cointegrating vectors normalized for PGDS, PGDFI, and PGDFC show that both CR and LD have positive association with PGDFI and PGDFC and not with PGDS. There is no cointegrating relationship identified when normalized for TFP. Juxtaposing these results show that CD and LD are associated with economic growth through enhancing fixed investment and capital formation and not through the channels of savings or total factor productivity. These results are consistent with the empirical literature that explores the nexus between savings, investment, productivity and economic growth where only investment causes economic growth (Sahoo, Nataraj and Kamaiah, 2001 and Saggar, 2003).

Table 1: Identifying Long Run Relationship between Law, Finance and Economic Growth and the Channels of Impact

Model‡	□ Coefficients	. □ Coefficients				Cointegration results	
		Y	X	Z	W	Rank†	Trace statistics±
F_{PGDP} (PGDP | PGDS, CR, LD)	1 + .205* - .678* - .907* (.05) (.12) (.10)	- .086* (.03)	.103 (.08)	- .185* (.05)	-.722* (.13)	1	17.78*
F_{PGDP} (PGDP | PGDFI, CR, LD)	1 - 1.339* - .236* - .539* (.65) (.03) (.02)	- .118* (.05)	.026* (.03)	.234* (.08)	1.078* (.197)	1	14.09*
F_{PGDP} (PGDP | PGDFC, CR, LD)	1 - .058 - .227* - .480* (.07) (.04) (.04)	- .105* (.063)	.077 (.18)	.309* (.08)	1.04* (.22)	2	13.05*
F_{PGDP} (PGDP | OPEN, CR, LD)	1 + .133* - .498* - .752* (.04) (.08) (.06)	- .086* (.044)	- .302* (.13)	.202* (.06)	.790* (.14)	1	22.57*
F_{PGDP} (PGDP | TFP, CR, LD)	1 + 8.951 + .018 + .023 (11.85) (.01) (.01)	-	- .824 (11.56)	- .038 (.11)	- .028 (.04)	1	4.56§
F_{PGDS} (PGDS | CR, PGDP, LD)	1 - 1.343* - 7.243* + .937 (.76) (2.70) (1.39)	- .013 (.02)	- .017 (.01)	- .035* (.00)	- .031 (.03)	1	24.01*
F_{PGDFI} (PGDFI | CR, PGDP, LD)	1 - .035* + .150* - .052* (.01) (.04) (.02)	.456 (.35)	1.193 (.77)	1.866* (.50)	2.348 (2.02)	1	26.82*
F_{PGDFC} (PGDFC | CR, PGDP, LD)	1 - .265* - .321 - .430* (.097) (.34) (.18)	- .439* (.18)	.138 (.09)	.196* (.06)	.284 (.20)	1	34.10*
F_{TFP} (TFP | CR, PGDP, LD)	1 - .000 + .001 - .000 (.00) (.00) (.00)	-	- .001 (.00)	.003 (.00)	.001 (.00)	0	0.21

‡ The model that is normalized on Y is denote by F_Y (Y | X, Z, W); * denotes 5% or better level of significance and ** denotes significant at 10% level; † When there are more than one cointegrating relationships we take the

first one. ± Ho of no cointegration (r=0) is rejected against at least one cointegrating equation at 5 % or better level of significance (p - values are from MacKinnon, Haug and Michelis, 1999). VAR lag length is chosen by AIC. § indicates 5% or better level of significance based on the critical values provided by Pesaran et.al (2001)

Causality Test Results

b) Granger Procedure

Bivariate Granger procedure for causality between bank credit and economic growth show that there is a significant one-way causal relationship from growth to finance for all the specifications of financial development. The null hypothesis of no causal relationship from growth to credit can be rejected at the 5% level or better, using lags based on AIC and BIC. Model specifications tests do not show any kind of model inadequacy. However, this analysis based on past values of bank credit and growth does not make use of all the available information i.e. the possibility of a third common variable that might cause both financial development and economic growth. In the subsequent analysis, legal development is introduced as an exogenous variable in a trivariate direct Granger causality model.

Table 2: Direct Granger Procedure with Three Variables: Economic Growth, Financial Development and Exogenous Legal Development (47 Observations)

Variables			$F(y \leftarrow x)$	$F(y \rightarrow x)$	$F(y \leftrightarrow x)$
y	x	z			
Δ ln(PGDP)	Δ ln(CR)	-	0.02 (0.895) [0.843]	5.68* (0.021) [0.531]	2.04 (0.161) [0.805]
Δ ln(PGDP)	Δ ln(CR)	Δ ln(LD)	3.28* (0.019) [0.526]	5.20* (0.028) [0.216]	1.09 (0.301) [0.448]
Δ ln(CR)	Δ ln(LD)	Δ ln(PGDP)	7.84* (0.007) [0.838]	1.21 (0.278) [0.605]	0.66 (0.420) [0.165]

Z is the conditioning (exogenous) variable. $F(y \leftrightarrow x)$ implies instantaneous causation.
H0: x does not Granger-cause y; Prob > F is in (); p value (Prob > Chi^2) for Breusch-Godfrey LM test for autocorrelation is given in [.]
* denotes that the null hypothesis of no causal relation can be rejected at the 10 percent or better level of significance.

Introducing legal development as a conditioning variable in the model changes the results drastically. Economic growth still has a good predictive power and the measures of financial development have become significant. Thus, there is a strong mutual causation between bank credit and growth. Further, to analyze the causal relationship between legal development and bank credit, economic growth is introduced as the exogenous variable in a trivariate Granger causality model. The results show that there is a strong one-way causation from legal development to bank credit.

d) Granger Causality/Block Exogeneity Wald Test in VAR

As there exist cointegrating relationship in all the models, Granger Causality/Block Exogeneity Wald Test are employed to ascertain the direction of causality. The aim of the test is to bring out whether legal development affects economic growth via financial sector growth. If there is a robust causation running from legal development (LD) to financial sector development measures and from the latter to economic growth then one could conclude that legal development indirectly causes economic growth by making financial sector active.

The results indicate that there is a strong causation between legal development and bank credit with a strong feed back effect. This feedback effect is not unexpected as there is minimum threshold level of financial sector development required for initiating legal developments. There is a one way causal relationship from back credit to growth with no feed back effect.

Table 3: Granger Causality/Block Exogeneity Wald Test

	CR	PGDP	LD
CR	-	Yes	Yes
PGDP	No	-	No
LD	Yes	Yes	-

'Yes' indicates a statistically significant causation running from a row variable to a column variable at 5% level or more.

e) Toda and Yamamoto Modified Wald Test

The modified Wald test for causality proposed by Toda and Yamamoto (1995) and Dalado and Lutkepohl (1996) using Seemingly Unrelated Regression (SUR) show that there is a strong causation running from legal development to bank credit and vice versa as the asymptotic chi-square (χ^2) test is rejected. Further, there is a mutual causal relationship between bank credit and economic growth from.

Table 4: Toda & Yamamoto test for causality in SUR

MODEL [Y X Z]				Chi^2
PGDP	CR	LD	$F(Y \leftarrow X)$	2.52* [0.10]

	F(Y ← Z)	25.68* [0.00]
	F(X ← Y)	19.28* [0.00]
	F(X ← Z)	26.05* [0.00]
	F(Z ← X)	10.73* [0.00]
	F(Z ← Y)	0.14 [0.70]

F(Y ← X) implies X causes Y i.e. Financial Development causes Economic Growth. Prob > Chi^2 is given in [.]

VII. Summary of Causality Test Results

Table 5 summarizes various causality test results when procedural law development (LD) is introduced as the third variable. Mutual causal relationship between back credit and economic growth is consistent across different econometric specifications. Procedural law development (LD) significantly causes back credit without feedback effect. Put together these results show that both economic growth and legal development causes the availability of credit in the economy and back credit leads to economic growth.

Table 5: Summary of Causality Test Results for LD

Model Specification	**Simple Granger Procedure**	**Wald Test in Levels VAR**	**Modified Wald Test for SUR**
PGDP← CR	Yes	Yes	Yes
CR ← PGDP	Yes	Yes	Yes
LD ← PGDP	No	No	No
PGDP ← LD	Yes	Yes	Yes
CR ← LD	Yes	Yes	Yes
LD ← CR	No	Yes	Yes

IV. Micro-econometric Evidence Using Bank Panel Data:

The data on banks are taken from PROWESS database of CMIE for all the banks that have a national commercial presence i.e. have a minimum of five commercial branches for the years 1993 and 1995. We have short listed 32 scheduled banks that have state specific and nationwide presence. Based on the data on the number of branches of each bank in different states we have classified banks as those with national presence and state specific banks. Bank of Rajasthan that has more than 80% of the activities in Rajasthan is clubbed among the banks

that have access to DRT whereas Tamil Nadu Mercantile Bank that has majority of its activities in Tamil Nadu is clubbed among the banks that did not have access to DTR in the sample period.

As mentioned at the onset, Debt Recovery Tribunals were introduced in a staggered way i.e. only a few states had access to DRT in the year 1994[14]. Data on commercial banks include advances to commercial sector in India (LADV), total advances including priority sector (LADVT), profits (LPROFIT) and banks' investments in India (LINV) for the years before and after the introduction of DRT i.e. for the years 1993 and 1995. To control for bank specific fixed effects we introduced number of employees and number of branches. Further to control for state specific effects, we introduce output per worker and investment per worker taken from Annual Survey of Industries (ASI).

Difference in Differences (DiD) Approach for Microeconometric evidence

The use of natural experiments (quasi experiments) has become wide spread in evaluating the effects of public interventions such as legal changes. Simple regression estimates with time dummy to capture the effects of policy changes would be misleading due to the temporal trends in the outcome variable caused by the other observed and unobserved events that occurred in the time span considered. In a quasi experiment only a portion of the population is affected by the policy change and the rest is unaffected. When the information is available over time on both the treated and control group for periods before and after policy intervention a difference in differences (DiD) approach can be employed to separate out the impact of treatment on the outcome variable.

The basic DID framework to evaluate the impact of Debt Recovery Tribunal on the advances made by banks (ADV) can be described as follows. Let ADV_{it} be the advance made by the bank i at time t. Suppose that there are two groups of banks indexed by treatment status DRT equals 0 or 1 where 0 indicates the banks that predominantly operate in the states where DRT was not introduced i.e. the control group that did not receive treatment. Banks in DRT exposed states that received treatment is indicated by the value 1 which is the treatment group. Pre

[14] The first set of DRT was introduced in Gujarat, Rajasthan, Delhi, Himachal Pradesh, Haryana, Punjab, Chandigarh, West Bengal, Karnataka and Andhra Pradesh in 1994.

treatment year (1993) and the post treatment year (1995) are indexed by T= 0, 1 where 1 stands for post treatment period.

$$ADV_{it} = \beta_0 + \beta_1 DRT_i + \beta_2 Post_t + \beta_3 \left(Post * DRT\right)_{it} + \alpha_i + \varepsilon_{it} \qquad (1)$$

Where, ε_i is a random, unobserved "error" term which contains all determinants of ADV_i that change over time which the model omits. α_i stands for bank and state specific time invariant unobservables or unobservable individual heterogeneity. Each banks lending behavior could be different for some historical reasons and preferences. β_3 is the Difference in Difference estimator that estimates the difference between the average advance made by DRT banks and the average advance made by non DRT banks. DiD is given by

$$\beta_3 = \left[E\left(ADV_2 \mid Post=1\right) - E\left(ADV_1 \mid Post=1\right)\right] - \left[E\left(ADV_2 \mid Post=0\right) - E\left(ADV_1 \mid Post=0\right)\right].$$

One of the most important assumption in estimating the βs in the equation (1) is that the error term is not correlated with the explanatory variables and E [εi] = 0. Simple pooled data regression suffers heterogeneity bias due to time invarying unobservable factors. With the help of panel data the time invarying unobservables could be differenced out. Thus the first differenced equation to be estimated is

$$\Delta ADV_{it} = \beta_0 + \beta_1 \Delta (Post*DRT)_{it} + \Delta \varepsilon_i \qquad (2)$$

Where, the OLS estimator of β_1 is the first differenced estimator.

Bank lending is a function of the demand for loans i.e. the market activity and the banks' ability to effectively attract deposits and convert them into loans. Thus, state level and firm level controls are introduced. We have introduced number of employees and branches as bank level controls and investment per worker and output per worker as control variables for economic activity.

We use fixed effects method as the data involves state and bank specific unobservables that are expected to be correlated with the other independent variables. When the data are repeated on the same subject as in our case, correlation within the panel of banks needs to be taken into

account. If not, the common group errors in the mixtures of individual and grouped data regression would result in biased standard error and the inferential statistics will be incorrect (Moulton, 1990). To start with, we use Huber-White robust standard errors to account for the intraclass correlation where the observations are independent across groups (Wooldridge, 2002). However, when the assumption of panel heteroskedasticity is true, Generalized Least Squares (GLS) estimates are more efficient. We use feasible generalized least squares (FGLS) model with generalized error structure to allow for heteroskedasticity and cross-sectional correlation across panels and AR(1) autocorrelation within each panels where each panel is assumed to have different AR(1) structure. Further, we use regressions with panels corrected standard errors where heteroskedastic error structure and contemporaneous correlation are allowed. By using these alternative model specifications, we hope to provide information on the robustness of the results[15].

V. Panel Results and Interpretation

We run a number of specifications with different assumptions to capture the true nature of the data. With the assumptions of state and bank specific unobserved variables correlated with the explanatory variable, we use fixed effect regression model for advances to commercial sector in India (LADV), total advances including priority sector (LADVT), profits (LPROFIT) and banks' investments in India (LINV). First, we run only DRT variable against all the dependant variables and subsequently introduced state and bank specific controls. Highly significant and positive sign for DRT (POSTDRT) indicates that introduction of DRT had increased the advance (LADV). However, the results could be driven by the bank specific and state specific effects that were not controlled. When investment per worker and output per worker to capture state specific information were introduced along with bank specific information measured by the number of employees and branches, DRT remains positive and highly significant.

Modified Wald test for group wise heteroskedasticity in fixed effect regression show that the model 1 and 2 i.e. fixed effect panel regressions with the assumption of homoskedasticity, suffers from severe group wise heteroskedasticity. In the models 3 and 4, we use standard errors corrected for cluster effects. Controlling for cluster correlation within the banks reduces

[15] See Greenberg, 2003 and STATA, 2003 and for more discussion.

the significance of DRT to a large extent but the F test for the significance of all the variables in the model is significant. Adjusting for panel heteroskedasticity and panel AR(1) in a FGLS framework improves the model fit and significance of the individual parameters, especially for DRT. Based on model 7 the presence of DRT increases advances to commercial sector by 1.3% (antilog of 0.263) vis-à-vis the banks do not have exposure to DRT. The above analysis shows that the impact of DRT is significant and robust across different specifications.

Table 6: Impact of DRT on Advances Made to Commercial Sector
Dependant variable: LADV

Variable	Fixed-effects Regression				FGLS regression		
	Model 1†	Model 2†	Model 3§	Model 4§	Model 5*	Model 6*	Model 7±
POSTDRT	0.369	0.268	0.340	0.152	0.591	0.263	0.263
	(0.105)	(0.089)	(0.069)	(0.086)	(0.116)	(0.038)	(0.049)
	[3.500]	[3.010]	[4.95]	[1.76]	[5.09]	[6.91]	[5.400]
INVPW		-0.073		-0.006		-0.079	-0.070
		(0.029)		(0.054)		0.017	(0.005)
		[-2.550]		[-0.12]		[-4.57]	[-14.90]
OUTPUTPW		0.057		0.071		0.042	0.026
		(0.023)		0.039		0.009	(0.007)
		[2.510]		[1.85]		[4.63]	[3.800]
LEMP		0.890		5.803		0.792	0.758
		(0.111)		2.003		0.092	(0.021)
		[7.990]		[2.90]		[8.62]	[36.260]
LBRANCH		0.020		-0.105		0.175	0.190
		(0.116)		0.038		0.105	(0.027)
		[0.180]		[-2.79]		[1.66]	[7.030]
CONS	6.884	-1.651	6.892	-47.66	6.801	-1.52	-1.178
	(0.218)	(0.590)	0.020	18.530	0.037	0.266	(0.072)
	[31.52]	[-2.80]	[350.31]	[-2.57]	[184.96]	[-5.71]	[-16.38]
# Observations (Groups)	56 (28)	56 (28)	56 (28)	56 (28)	56 (28)	56 (28)	56 (28)
Prob > F	0.00	0.00	0.00	0.00			
Prob > Chi^2					0.00	0.00	0.00
Loglikelihood					-56.11	-1.04	29.92
Wald test‡	0.00	0.00					
	(0.00)	(0.00)					
R-sq: within	0.29	0.64	0.29	0.64			

POSTDRT is POST * DRT i.e. access to DRT in the year 1995. † Standard errors are given in (.) and t statistic is given in [.]; § Standard errors adjusted for clusters; ∗ Adjusted for panel heteroskedasticity; ± Adjusted for panel AR(1); ‡ Modified Wald test for group wise heteroskedasticity in fixed effect regression

Introduction of DRT has positive impact on other bank performance measures such as total advances made in India (LADVT), investment (LINV) and banks' profit (LPROFIT). Even after controlling for bank and state effects the impact of DRT is highly significant for total advances made and investment made within India. Final regression after controlling for panel autocorrelation and heteroskedasticity (model 7) show that total advances made in India (LADVT) is higher by 1.3% (antilog of 0.263), investment (LINV) is higher by 1.5% (antilog of 0.393) and banks' profit (LPROFIT) is higher by 1.6% (antilog of 0.493) vis-à-vis the banks did not have access to DRT. However, the impact of DRT on profits is not consistent across different specifications.

Robustness of the Results

To test the robustness of the results obtained from the full sample, we restrict the sample to only truly regional banks i.e. all bank that have nationwide presence were removed from the sample. This leaves us with the sample of 25 banks. In the earlier analysis, banks with national presence were clubbed in the group that had access to DRT. The impact of DRT has turned out to be positive and significant for all the measures of banking performance considered (see Table 10 in the appendix). The magnitude of the impact is also more or less the same.

VI. Summary and Conclusion

In the literature, the availability of external finance, legal development and economic growth are linked in the following manner. A good substantive and procedural law, if enforced effectively, would enhance the investor and creditor confidence in the system, which would result in larger volume of credit dispersed and ultimately economic growth. The broad objective of this paper is to establish the long run relationship in the above mentioned channel pertaining to the Indian context. In particular, the impact of legal development is analyzed in a trivariate causality and cointegrating VAR frameworks.

To stat with legal development, private credit, economic growth and one of the possible channels of impact is introduced in a VAR system to identify the long run relationship. A single cointegrating vector is identified in all of the specifications indicating that there is a long run equilibrium relationship among the variables considered except for total factor productivity (TFP). The coefficients of private credit (CR) and procedural law development (LD) have

turned out to be significant and positively associated with economic growth. The channels of impact are identified to be fixed investment and capital formation and not savings or total factor productivity. The results suggest that law and finance leads to economic growth through debt accumulation channel rather than enhancing total factor productivity. These results are consistent with the past literature (Bell and Rousseau, 2001), however this study more comprehensive in incorporating the determinants financial sector such as legal and regulatory developments. Further these results are consistent across different specifications of economic activity i.e. size of industry in GDP (INDUST) and size of manufacturing sector (MANUFACT).

As mentioned at the onset, the second objective is to establish causation between the variables of interest. The number of variables in the causal relationship is restricted to three. The simple Granger procedure without the conditioning variable do not lend to the thesis of 'finance causes growth' instead there is a significant one-way causation runs from growth to finance. However, once the conditioning variable such as legal development is introduced in the model there is a strong mutual causation from economic growth and financial development. Causality tests based on VAR show that legal development positively affects the availability of credit. Toda and Yamamoto modified Wald tests

Overall, these results show that the index of procedural law (LD) positively affects private credit in the long run. It is the provisions that speeded up the process of redress instead of law on books per se that matter for financial sector development in India. This confirms the proposition that mere law on books does not explain financial sector development rather it is the procedural law which make a huge difference for financial sector development. However while this explains why India is an outlier in LLSV study, it could be argued that the procedural law might also suffer the same enforcement lapses as the substantive law. A possible extension of this study is to incorporate a measure of enforcement.

There is some evidence at the micro level that the newly introduced procedural law work relatively well (Visaria, 2007; Rathinam and Raja, 2008). The second section of the paper analyzes the importance of the quality of judiciary especially speedy disposal on bank lending activities and performance in a more micro level analysis using bank level panel data. The dataset on banking performance contains information on total advances made, advances to

commercial sector and bank profits. In this quasi experiment study, we use the staggered introduction of Debt Recovery Tribunals starting from 1994 in the Indian states. We have used difference in difference approach to single out the impact of DRT on the measures of banking performance.

DRT dummy is highly significant and positively associated with advances made to commercial sector (LADV), total advances (LADVT) and profits. These results show that speeding up of debt recovery matters have resulted in efficiency and is consistent with our model illustrating lender creditor relationship. These results do not change when bank and state specific controls were introduced in the basic model. Moreover, results are robust to alternative specifications. As a test of robustness, we have redone the exercise for a restricted data set that excludes banks with nationwide presence. These results also confirm the positive impact of DRT on bank performance.

To summarize we have produced both macro and micro level evidence on the importance of legal development, especially the procedural law development on the availability of credit in the developing economy. Time series evidence show that law and credit affects economic growth through enhancing investment. Further, law causes credit and a mutual causal relationship exists between credit and growth. Panel data evidence also confirm that one of the procedural law innovation in India, the introduction of DRT, had positive impact of the availability of credit to private sector.

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Appendix

Table 7: Impact of DRT on Total Advances Made in India
Dependant variable: LADVT

Variable	Fixed-effects Regression				FGLS regression		
	Model 1†	Model 2†	Model 1§	Model 2§	Model 1*	Model 2*	Model 3±
POSTDRT	0.350	0.230	0.325	0.112	0.721	0.263	0.236
	(0.106)	(0.093)	(0.060)	(0.090)	(0.150)	(0.050)	(0.046)
	[3.300]	[2.460]	[5.440]	[1.250]	[4.820]	[5.320]	[5.100]
INVPW		-0.049		0.003		-0.057	-0.043
		(0.027)		(0.040)		(0.013)	(0.007)
		[-1.780]		[0.070]		[-4.380]	[-6.490]
OUTPUTPW		0.038		0.070		0.032	0.020
		(0.021)		(0.040)		(0.008)	(0.005)
		[1.830]		1.740]		[4.020]	[3.850]
EMP		0.999		[5.056		0.887	0.992
		(0.113)		(2.275)		(0.080)	(0.024)
		[8.840]		[2.220]		[11.100]	[41.890]
LBRANCH		0.041		-0.036		0.155	0.040
		(0.112)		(0.052)		(0.079)	(0.025)
		[0.370]		[-0.700]		[1.960]	[1.610]
CONS	7.121	-2.221	7.129	-39.661	6.981	-1.805	-2.002
	(0.272)	(0.528)	(0.017)	2(0.527)	(0.049)	(0.278)	(0.121)
	[26.15]	[-4.21]	[423.50]	[-1.93]	[143.80]	[-6.48]	[-16.60]
# Observations (Groups)	64 (32)	64 (32)	64 (32)	64 (32)	64 (32)	64 (32)	64 (32)
Prob > F	0.00	0.00	0.00	0.00			
Prob > Chi^2					0.00	0.00	0.00
Log likelihood					-79.77	-2.53	32.63
Wald test‡	0.00	0.00					
	(0.00)	(0.00)					
R-sq: within	0.24	0.49	0.24	0.49			

† Standard errors are given in (.) and t statistic is given in [.]; § Standard errors adjusted for clusters; ∗ Adjusted for panel heteroskedasticity; ± Adjusted for panel AR(1); ‡ Modified Wald test for group wise heteroskedasticity in fixed effect regression

Table 8:Impact of DRT on Bank Profit
Dependant variable: LPROFIT

Variable	Fixed-effects Regression				FGLS regression		
	Model 1†	Model 2†	Model 1§	Model 2§	Model 1*	Model 2*	Model 3‡
POSTDRT	0.551	0.356	0.443	0.383	0.756	0.247	0.493
	(0.262)	(0.242)	(0.259)	(0.397)	(0.138)	(0.060)	(0.190)
	[2.100]	[1.470]	[1.710]	[0.960]	[5.460]	[4.140]	[2.600]
INVPW		-0.113		[-0.113]		[-0.070]	-0.128
		(0.058)		(0.114)		(0.019)	(0.038)
		[-1.970]		[-0.990]		[-3.770]	[-3.380]
OUTPUTPW		0.052		0.116		0.025	0.072
		(0.045)		(0.107)		(0.014)	(0.036)
		[1.160]		[1.080]		[1.760]	[2.030]
LEMP		0.824		-0.859		1.019	0.522
		(0.445)		(5.566)		(0.183)	(0.343)
		[1.850]		[-0.150		[5.560]	[1.520]
LBRANCH		0.127		2.417		-0.005	0.498
		(0.466)		(2.494)		(0.197)	(0.392)
		[0.270]		[0.970]		[-0.020]	[1.270]
CONS	5.055	-2.775	5.095	-2.542	5.013	-3.682	-2.521
	(0.288)	(1.311)	(0.075)	(51.268)	(0.053)	(0.485)	(0.596)
	[17.55]	[-2.12]	[67.72]	[-0.05]	[93.78]	[-7.59]	[-4.23]
# Observations (Groups)	62 (31)	62 (31)	62 (31)	62 (31)	62 (31)	62 (31)	62 (31)
Prob > F	0.112	0.34	0.09	0.00			
Prob > Chi^2					0.00	0.00	0.00
Log likelihood					-78.68	-20.45	-55.59
Wald test‡	0.00	0.00					
	(0.00)	(0.00)					
R-sq: within	0.08	0.19	0.08	0.19			

† Standard errors are given in (.) and t statistic is given in [.]; § Standard errors adjusted for clusters; ∗ Adjusted for panel heteroskedasticity; ± Adjusted for panel AR(1); ‡ Modified Wald test for group wise heteroskedasticity in fixed effect regression

Table 9 Impact of DRT on Bank Investment in India
Dependant variable: LINV

Variable	Fixed-effects Regression				FGLS regression		
	Model 1†	Model 2†	Model 1§	Model 2§	Model 1*	Model 2*	Model 3‡
POSTDRT	0.593	0.382	0.559	0.267	0.827	0.382	0.393
	(0.130)	(0.104)	(0.074)	(0.111)	(0.118)	(0.050)	(0.032)
	[4.560]	[3.690]	[7.530]	[2.420]	[6.980]	[7.660]	[12.120]
INVPW		-0.017		-0.021		-0.016	-0.015
		(0.022)		(0.055		(0.018	(0.004)
		[-0.780]		[-0.380]		[-0.860]	[-3.760]
OUTPUTPW		0.015		0.129		0.024	0.010
		(0.017)		(0.081		(0.014	(0.005)
		[0.890]		[1.600]		[1.750]	[2.090]
LEMP		0.891		2.897		0.966	0.889
		(0.101)		2.715		(0.053	(0.020)
		[8.840]		[1.070]		[18.160]	[44.120]
LBRANCH		0.103		0.009		0.048	0.105
		(0.107)		(0.058		(0.056	(0.022)
		[0.960]		[0.150]		[0.860]	[4.770]
CONS	7.016	-1.817	7.026	-21.233	6.947	-2.341	-1.771
	(0.235)	(0.416)	(0.022)	(24.763)	(0.076)	(0.254)	(0.109)
	[29.82]	[-4.37]	[326.12]	[-0.860]	[91.86]	[-9.22]	[-16.32]
# Observations (Groups)	60 (30)	60 (30)	60 (30)	60 (30)	60 (30)	60 (30)	60 (30)
Prob > F	0.112	0.34	0.09	0.00			
Prob > Chi^2					0.00	0.00	0.00
Log likelihood					-76.51	-.72	47.94
Wald test‡	0.00	0.00					
	(0.00)	(0.00)					
R-sq: within	0.38	0.58	0.38	0.58			

† Standard errors are given in (.) and t statistic is given in [.]; § Standard errors adjusted for clusters; ∗ Adjusted for panel heteroskedasticity; ± Adjusted for panel AR(1); ‡ Modified Wald test for group wise heteroskedasticity in fixed effect regression

Table 10: Impact of DRT on Selected Banking Performance Measures (Restricted Sample without Nationwide Banks)

	FGLS regression			
Dept. Variable	LADV	LADVT	LPROFIT	LINV
POSTDRT	0.218 (0.069) [3.160]	0.234 (0.060) [3.870]	0.696 (0.282) [2.470]	0.370 (0.040) [9.150]
INVPW	-0.065 (0.005) [-12.70]	-0.046 (0.007) [-6.380]	-0.137 (0.041) [-3.350]	-0.013 (0.004) [-3.130]
OUTPUTPW	0.021 (0.008) [2.730]	0.024 (0.006) [4.350]	0.077 (0.043) [1.770]	0.008 (0.005) [1.610]
LEMP	0.721 (0.036) [20.31]	0.975 (0.023) [42.790]	0.250 (0.413) [0.610]	0.861 (0.032) [26.670]
LBRANCH	0.225 (0.046) [4.920]	0.068 (0.021) [3.210]	0.706 (0.477) [1.480]	0.114 (0.037) [3.090]
CONS	-1.033 (0.081) [-12.76]	-2.028 (0.163) [-12.45]	-1.437 (0.801) [-1.79]	-1.575 (0.132) [-11.90]
# Observations (Groups)	48 (24)	48 (24)	48 (24)	48 (24)
Prob > Chi^2	0.00	0.00	0.00	0.00
Log likelihood	17.35	24.34	-47.86	37.98

Standard errors adjusted for panel AR(1) is given in (.)