

Financial intermediation and economic development in the state of Bihar, India: A district-level analysis

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- Financial intermediation and its effect on economic development have received considerable attention in the literature (Burgess and Pande, 2005; Cole, 2009; Banerjee and Duflo, 2012; Kendall, 2012).
- Theory provides conflicting predictions. Empirically, the results have been equally mixed (Beck and Levine, 2004; Loayza and Ranci ere, 2006). However Lack of access to finance has been argued to be one of the main factors behind low level of development (Levine, 2008).
- Theoretically, since Bihar is at the lower end of the development spectrum, the relationship could run from finance to development.
- This study attempts to assess the effectiveness of banking sector's contributions to the overall development in Bihar.

Introduction

- We try to understand the efficiency of the banking sector in Bihar with regard to its ability to raise deposits and disburse funds to private sector in Bihar.
- Financial deepening \Rightarrow Rise in savings and bank deposits \Rightarrow Deposits are converted to loans \Rightarrow Better screening of projects leads to higher income.
- Any gap between deposits and lending - typically measured by credit-deposit ratio (CD) - is an indicator of financial sector development and also indicates an overall link between financial sector and economic activities.
- Given observed low credit-to-deposit ratio across banks and districts, it needs to be studied whether or not financial development can have favourable effect across sub-regions within Bihar.

Policy interventions in financial intermediation

- First, credit is used as a tool for redistribution and programmes like implicit government guarantees, and loan waiver schemes towards priority sectors like agriculture implies that such decisions are often based on social welfare cum political criteria.
- Second, banks in India are often federal and link between credits granted to a particular state may or may not be strongly related to overall deposits in that state.
 - A low CD ratio would mean that for every Rupee deposited, credit flow is lower \Rightarrow lower investments in the state.
- Finally, many regional rural banks are also co-operatives that also make the loan decisions based on norms other than profit maximizing.
- Given CD ratio as an operational indicator of financial deepening, we examine the pattern of CD ratio across districts in Bihar in the light of high growth performance in recent years.

Financial Intermediation in Bihar

- The CD ratio in Bihar is behind the national average of 72.6% and other states like Tamil Nadu (108.9%), Maharashtra (90.8%), Rajasthan (80.2%), West Bengal (60.8%), MP (57.4%).

CD Ratio				
Year	Mean	Median	Max	Min
2001	-	-	-	-
2002	-	-	-	-
2003	-	-	-	-
2004	33.20	31.35	69.48	17.35
2005	34.07	31.34	59.85	20.10
2006	35.24	32.28	58.19	22.07
2007	33.91	31.58	55.59	20.68
2008	30.86	28.31	49.10	18.78
2009	33.41	31.57	49.85	20.08
2010	33.16	30.59	52.01	18.54
Total	33.41	31.12	69.48	17.35

- We therefore examine the extent to which the CD ratio and other financial indicators in Bihar influence the district-level development and also assess sectoral credit flows at sub-regional level.

Main findings

- 1 The overall CD ratio shows a remarkable stability across districts and bear almost negligible correlation with economic activity. On the other hand, impact of CD ratio on the economic growth is at best statistically significant for a sample until 2008.
 - 1 A major intervention in 2008 is the implementation of the agricultural debt waiver and relief scheme by Government of India covering nearly 37 million farmers to mitigate the consequences arising out of growing indebtedness and agrarian crisis.
- 2 However, when we extend our analysis to include the impact of CD ratio at sectoral level on output, we find its impact positive and significant for agriculture and transport infrastructure, but very negligible for industry and consumption loan.
- 3 We find that the public provision of working capital loan to farmers in the form of Kisan Credit card (KCC) has a positive and significant impact on agricultural output.

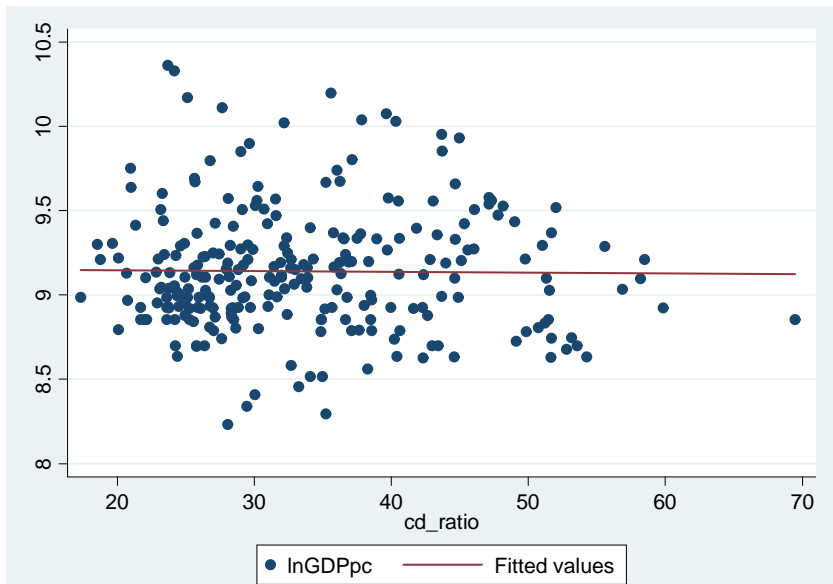
Some Facts: Bank-wise NPAs, CD Ratio and Market Share by end-fiscal year 2009-10

- Due to advances being written off every year, CD ratio could be remaining unchanged for major state-owned commercial banks.

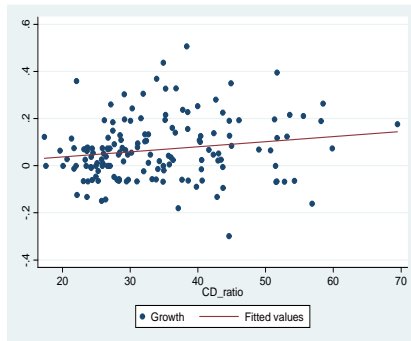
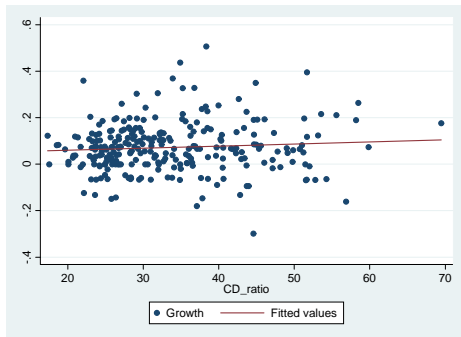
	Loans (INR Mn.)	NPAs (%)	Written off (%)	CD Ratio (%)	M-Share (%)
Lead Commercial Banks	196288.0	7.9	2.3	30.2	67.6
Other State-owned banks	43503.6	8.7	4.9	26.1	15.5
Private banks	5102.5	1.4	0.0	18.9	2.4
Co-operative banks	6314.5	50.2	0.0	41.4	1.6
Regional Rural Banks	48231.8	6.1	2.7	37.6	13.0
Total for Bihar	299440.4	8.5	2.6	30.3	100.0

Source: Calculated with data from SLBC, Bihar, 2009-10.

Real GDP per capita and CD ratio



Growth and CD ratio (full sample and until 2008)



Empirical strategy

- We hypothesise a standard relation between development (y) and financial intermediation (FI):

$$\ln y_{it} = x_{it}\beta + \alpha i + \delta t + \epsilon_{it} \quad (1)$$

- where y_{it} is GDP per capita for district i in period t . x_{it} refers to CD ratio (CD), and other FI variables

$$\begin{aligned} \ln y_{it} = & \alpha i + \delta t + \beta_1 CD_{it} + \beta_2 KCC_{it} \\ & + \beta_3 CGAP_{it} + \beta_4 BBR_{it} + \epsilon_{2t} \end{aligned} \quad (2)$$

- KCC : Kisan Credit Cards (KCC allows credit being provided to farmers for agricultural operations);
- $CGAP$: credit gap (proportion of actual credit in targeted credit limit (i.e., percentage achieved));
- BBR : bank branches can capture their fund mobilisation and deployment capacity;
- δt : time fixed effects which captures business cycle effects; αi : unobserved district heterogeneity like local conditions or environment.

The Sectoral deployment of credit

- The GDP per capita measures the level of sub-regional development, while CD ratio measures financial deepening in the district and KCC measures the political preferential policies towards farmers.
- While CD ratio, KCC and bank branches can be thought of as the supply side of credit flow, the demand side can be reflected via CGAP.
- We construct sectoral CD ratios at district level which directly measures proportion of bank deposits in a district that is allocated as loans to different sectors.
- The sectoral deployment of credit can reveal the demand originating in a sector which could also reflect whether it is a high-return sector from the bank's point of view or there are state guarantees in place that encourage banks to create loans to that sector.
- Besides, we also look at firm level data for 56 companies in Bihar (the data on 46 are usable) to analyze whether bank-financing and equity financing are substitutes or complements in Bihar.

Aggregate results

- We find that the low CD ratios indicate inefficiency in the use of credit and raise concerns as to why banks are not lending as much as they are mobilising in the form of deposits.
- There is insignificant relation between per capita income and CD-ratio, implying that districts with higher CD ratio do not appear to have higher per capita income across all districts on average using data from 2004 onwards
- Districts with higher KCC tend to have higher per capita income, although there is regional heterogeneity across districts.

Regression of per capita income on CD ratio across districts

	(1) †	(2) †	(3) †	(4) † †
Constant	9.189*** (0.1678)	7.461*** (0.1117)	8.013*** (0.1927)	7.942*** (0.1424)
CD ratio	-0.00816* (0.0032)		-0.00698* (0.0027)	0.00268 0.0018
KCC		0.151*** (0.0114)	0.125*** (0.0137)	0.0956*** (0.0109)
Fixed effect	YES	YES	YES	YES
R²	0.7909	0.8094	0.8484	0.9821
N	258	258	258	108

Sectoral distribution of credit

- Bihar predominantly has an agriculture based economy.

	2007		2008		2009		2010	
	No. of Accounts	Percentage share in credit	No. of Accounts	Percentage share in credit	No. of Accounts	Percentage share in credit	No. of Accounts	Percentage share in credit
Agriculture	47	24	50	22	55	36	58	33
Industry	5	22	4	25	3	10	3	11
Transport operators	1	1	1	1	1	1	1	1
Professional and other services	1	3	2	4	2	4	2	5
Personal loans	23	32	22	31	19	30	17	28
Trade	17	14	13	12	15	16	14	17
Finance	0	0	0	1	0	0	0	0
All others	4	4	7	4	4	3	4	3
Total bank credit	100	100	100	100	100	100	100	100
Total bank credit	336	27519	333	30549	380	23143	412	29853

Sectoral regression results

- Regression of GDP per capita on CD ratio of each sector across districts (2008-10)

CD Ratio								
Constant	8.846*** (0.0536)	9.004*** (0.0455)	8.901*** (0.0446)	8.900*** (0.0562)	9.087*** (0.0672)	8.901*** (0.0595)	8.955*** (0.0451)	8.979*** (0.0791)
Agriculture	0.00834*** (0.0023)							
Industry		-0.0059* (0.0025)						-0.003 0.0028
Transport operators			0.142*** (0.0371)					0.111* (0.038)
Professional and other services				0.0326 (0.0165)				0.0380 (0.016)
Personal loans					-0.0085* (0.0037)			-0.0085 (0.003)
Trade						0.0143 (0.0083)		-0.0046 (0.008)
Finance and all others							0.031 (0.0199)	0.022 (0.017)
Fixed effect	YES	YES	YES	YES	YES	YES	YES	YES
R ²	0.9684	0.9654	0.9690	0.9645	0.9651	0.9641	0.9638	0.974
N	108	108	108	108	108	108	108	108

Sectoral CD ratios and real per capita income at district level

- Our results show that sectoral CD ratio in agriculture did have a positive impact on per capita income, although the aggregate CD ratio had no significant impact over the reduced sample period.
- The sectoral relationship is positive and significant only in the case of credit to agriculture and transport infrastructure, but not in other sectors.
- We also examine the relationship under annual credit plan across districts focusing on both demand for (actual loans made) and supply of credit (credit limit) respectively by banks.
 - We find that districts where the percentage realised of actual in targeted credit is higher (lower than the planned allocation could reflect credit rationing), CD ratio shows a negative indirect impact on income, while the direct effect is positive.

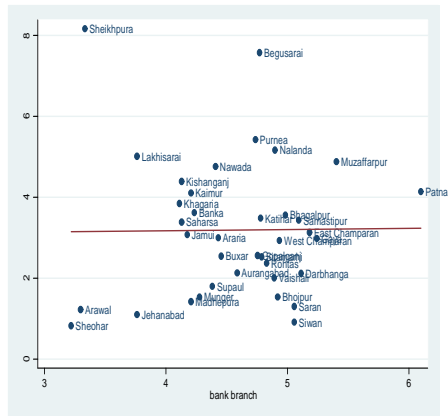
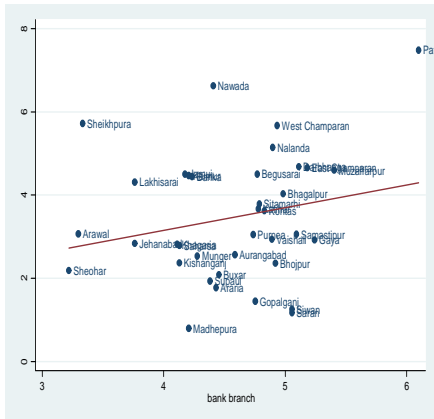
District-wise performance under annual credit plan (ACP) for 2008-10

Constant	8.790*** (0.0899)	8.803*** (0.1050)	8.207*** (0.1680)	7.913*** (0.1750)
KCC	‡	‡	0.0632*** (0.0159)	0.0993*** (0.0170)
CD ratio	0.00570** (0.0020)	0.00466 (0.0024)	0.00443* (0.0019)	0.00248 (0.0020)
CD ratio x Credit gap in priority sectors	-0.0041*** (0.0000)	--	-0.0019** (0.0000)	--
CD ratio x Credit gap in non priority sectors	--	-0.00194*** (0.0000)	--	0.0133 (0.0000)
Fixed effect	YES	YES	YES	YES
R²	0.97.81	0.9726	0.9826	0.9818
N	108	108	108	108

Robustness - controlling for credit gap and bank branches

- We look at another financial intermediation indicator to check the robustness of our results with regard to the relationship between CD ratio and GDP per capita at district level, controlling for the interaction of credit gap with district level bank branch expansion.
- We include an interaction term between credit gap in (priority vs. non- priority) and bank branches to uncover any non-linearity in the data and show its impact on per capita income.
- We find that districts with higher level of bank branches do have positive and significant effect on the development in those districts.

Credit Gap vs. Bank Branches (in Priority (left) & non-Priority (right) sectors)



Effect of Bank Branches on per capita income across Sectors and Regions

	Model 1		Model 2	
	A	B	A	B
Constant	8.406*** (0.3952)	8.289*** (0.3756)	7.825*** (0.6531)	7.177*** (1.020)
Log of bank branch	0.198* (0.0858)	0.254** (0.0755)	0.251** (0.0897)	0.251* (0.0897)
CD ratio	-0.0053 (0.0049)	-0.0103 (0.0054)	0.0144 (0.0185)	0.014 (0.0185)
Credit gap in priority sectors x log bank branch	0.0148* (0.0060)	--	0.009 (0.0071)	0.009 (0.0071)
Credit gap in non priority sectors x log bank branch	--	0.0179* (0.0066)	0.005 (0.0084)	0.005 (0.0084)
Category-A			--	0.648 (0.4460)
Category-B			-0.223 (0.1605)	0.424 (0.3580)
Category-C			-0.383 (0.2280)	0.265 (0.2741)
Category-D			-0.146 (0.6481)	0.501* (0.2296)
Category-E			-0.648 (0.4461)	--
R²	0.4118	0.4333	0.5405	0.5405
N	35	35	35	35

Firm-level relationship between financing and performance

	Panel-A				Panel-B			
Total Income					Total Value added			
Constant	5.947*** (0.3917)	5.293*** (0.4022)	0.788 (0.4108)	-0.0602 (0.4676)	Constant	8.144*** (0.3090)	8.174*** (0.2907)	8.177*** (0.2906)
Borrowing	0.417*** (0.0380)	0.287*** (0.0442)	-0.108* (0.0419)	0.112 (0.0728)	Debt share	-0.0331** (0.0110)	0.0121 (0.0117)	-0.0187 (0.0288)
Equity capital	‡	0.363*** (0.0674)	-0.246*** (0.0640)	-0.212** (0.0640)	Equity share	‡	-2.666*** (0.3225)	-2.499*** (0.3524)
					Debt share squared	‡	‡	0.000284 (0.0002)
Total assets	‡	‡	1.131*** (0.0640)	1.169** (0.0641)				
Borrowing squared			‡	-0.0236** (0.0064)				
R²	0.8774	0.8833	0.9252	0.927		0.8776	0.8918	0.8921
N	605	605	605	605		566	566	566

Implications

- 1 Along with the sectoral focus and financial resources, here we consider the impact of such financial resources on the industrial sector.
- 2 We find that borrowing and equity financing have a positive impact on firm output, but when we control for firm size via total assets, the effect turns insignificant.
- 3 When we include a squared term for borrowing to capture any non-linearity, the impact is negative confirming that firms with high level of borrowing tend to experience higher debt burden influencing their output negatively.
- 4 Since both sources have negative impact, we separated firms with high and low levels of borrowing.
- 5 We find that there are only 6 firms (out of 46) who have high debt ratio (above average), and those firms' equity ratio is also above average. From this we conclude that firms with high debt tend to have high equity which might explain the negative impact of equity on performance.

Some More Insights

- We find sectoral correlation especially with agriculture. The districts where such correlation exists are traditionally the fertile belt of Bihar and grows rice, wheat, sugarcane and even fruits. These also have a lot of food processing industries dominated by the SME sector.
- Since these have historically been relatively well-off districts, the NPA rate there has been low. Also because this belt has higher lobby power, the bulk of the initial investment has been focused on these districts.
- For districts which have high CD ratio but no corresponding high growth rate e.g. Nawada, Supaul, Begusarai, Buxar – these districts have been traditionally backward.
- Nawada is dependent on handicrafts, tribal output rather than much of industry or agriculture. It is currently receiving funds from the Backward Regions Grant Fund Programme (BRGF). Buxar too depends on dying sugarcane industry and animal husbandry.

Conclusions

- Given the low level of financial development in Bihar (below 20% credit-GDP ratio), the positive link between finance and development is coming out only in the context of agricultural sector.
- The stagnation in CD ratio is a clear indication of low level of financial intermediation which appears to be due to historical NPAs driving down the appetite of the financial intermediaries to make loans.
- The government intervention in the priority sector continues to encourage banks to make loans into this sector, which receives the highest sectoral credit flow.
- Measures such as KCC and bank branch expansion at district level tend to have positive effect on per capita income in Bihar.
- Easing government restrictions in the banking system (such as credit rationing due to priority sector lending or loan waiver incentives, and entry barriers) can aid the process of financial development in Bihar.