Credit Contract Enforcement, Misallocation, and Income Disparities across Indian States

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Abstract

This paper shows how cross-state differences in credit contract enforcement contribute to income disparities in India. I develop a dynamic heterogeneous-agents general equilibrium model with voluntary and involuntary entrepreneurs, where credit contract enforcement shapes borrowing constraints, occupational choices, and factor allocation. A common-credit-market extension allows for capital mobility across states. Stronger enforcement reduces misallocation and raises output; calibrated results suggest credit contract enforcement explains about 6 percent of income gaps in 2017–18. Empirically, using NSS data and a judicial reform that accelerated civil case resolution, I find improved enforcement shifts individuals from voluntary entrepreneurship into wage work and involuntary self-employment, consistent with the model's mechanisms.

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1 Introduction

Research over the past several decades has pointed to the importance of financial frictions, broadly, in explaining a significant part of the disparities in per capita incomes across countries. A key challenge remaining from this research is identifying the particular frictions and assessing their quantitative importance. In this paper, I address this challenge by studying the importance of enforcement of credit contracts in driving per capita income differences across Indian states.

I develop a dynamic heterogeneous-agent general-equilibrium model in which Indian states differ in the enforcement of credit contracts. These differences shape borrowing constraints, occupational choice, and the allocation of capital and labor, generating variation in firm scale and per-capita income. I complement the theoretical analysis with empirical evidence exploiting quasi-experimental variation from a major judicial reform in India. Together, the quantitative and empirical analyses assess how enforcement-related institutional differences translate into differences in occupational allocation and per-capita income.

The theoretical framework contains three occupational categories: voluntary entrepreneurs, involuntary (or necessity) entrepreneurs, and workers. Individuals differ in entrepreneurial ability, asset holdings, and labor-market opportunities. Credit contract enforcement determines the tightness of borrowing constraints faced by entrepreneurs, thereby shaping the scale at which firms operate and the profits they generate. Variation in enforcement leads to differences in factor allocation across firms and occupations, which in turn affect aggregate productivity and income.

A central feature of the model is occupational choice. Individuals with access to wage employment choose between wage work and entrepreneurship, while those without such opportunities can only be entrepreneurs. Credit constraints affect these choices by altering the relative returns to entrepreneurship and wage employment. Improved enforcement relaxes borrowing constraints for productive but asset-poor entrepreneurs, allowing them to expand firm scale and increase output. At the same time, general-equilibrium adjustments in wages and interest rates affect entry thresholds and production costs, leading to a reallocation of individuals across occupations. Through this mechanism, enforcement influences both the composition of firms and the distribution of talent across production units.

The distinction between voluntary and involuntary entrepreneurship is particularly important in the Indian context, where a large share of the workforce operates very small firms due to limited access to wage employment. These involuntary (necessity) enterprises typically operate at subsistence scale but remain credit-dependent, as even minimal production requires working capital. As a result, weak enforcement affects not only high-productivity entrepreneurs but also a large mass

of low-productivity firms, amplifying aggregate misallocation. By explicitly modeling involuntary entrepreneurship as arising from binding labor-market constraints rather than comparative advantage, the framework captures a salient feature of labor-surplus economies and strengthens the link between enforcement frictions and aggregate outcomes.

The quantitative analysis focuses on explaining cross-state income differences within India. Studying variation across states offers two advantages. First, income disparities are large: per-capita incomes differ by nearly a factor of five between the richest and poorest states. Second, a within-country setting holds fixed many institutional and macroeconomic factors—such as national laws, monetary policy, and legal origins—that are difficult to control for in cross-country comparisons. This environment allows enforcement of credit contracts to vary across states while other institutional features remain common, facilitating both empirical identification and quantitative calibration.

State-level enforcement is disciplined using judicial data on the speed of resolution of civil suit cases in district and sessions courts. Slower case resolution weakens the credibility of credit contracts by delaying or undermining lender's ability to recover claims, thereby tightening borrowing constraints faced by firms. Judicial speed therefore provides a natural proxy for enforcement capacity at the state level. I use these data directly in the calibration of the model and also exploit them for empirical validation.

Quantitatively, the model evaluates how much of the observed cross-state variation in income can be attributed to differences in credit contract enforcement. The calibration proceeds by first estimating national parameters common to all states and then disciplining state-specific enforcement using two complementary approaches. Under the first approach, enforcement is mapped directly from observed judicial speed. Under the second, enforcement is inferred by matching the model-implied external finance–to–GDP ratio to state-level data from the RBI Handbook of Statistics on Indian States. When enforcement is calibrated using judicial data, the model explains approximately 6 percent of the cross-state variation in per-capita income in 2017–18. The alternative calibration implies an explanatory power of about 3.5 percent. In both cases, the model reproduces broad differences in average firm size observed across states, indicating that enforcement-related credit constraints play a meaningful role in shaping aggregate outcomes.

I also extend the model to allow for financial integration across states through a nationally integrated capital market with a common interest rate. In this environment, capital is mobile across states while firms and labor remain geographically immobile. The extension highlights how differences in credit contract enforcement interact with capital mobility: states with stronger enforcement attract capital inflows and expand firm scale, while weaker-enforcement states experience

capital outflows and constrained investment. As a result, financial integration amplifies regional disparities in capital allocation and income.

To validate the model's implications for occupational reallocation, I complement the quantitative analysis with an empirical exercise exploiting cross-state variation in the implementation of the 2002 amendment to the Code of Civil Procedure (CPC). The CPC reform introduced procedural changes aimed at accelerating civil court processes, thereby strengthening the enforcement of contracts. Since Indian states had adopted similar procedural changes at different times prior to 2002, the reform generated heterogeneous improvements in judicial speed across states. I exploit this variation using a difference-in-differences design, following prior work on judicial reforms in India.

Using individual-level data from multiple rounds of the National Sample Survey Employment and Unemployment Surveys, I examine how changes in judicial efficiency affect occupational choice. Occupations are classified into voluntary entrepreneurs, involuntary entrepreneurs, and wage workers. The results indicate that states experiencing larger improvements in judicial speed exhibit a decline in voluntary entrepreneurship and an increase in wage employment and involuntary entrepreneurship. Placebo tests using pre-reform periods show no differential trends by treatment intensity, supporting the identification strategy. These findings are consistent with the model's general-equilibrium mechanism, in which higher wages and tighter entry thresholds reshape occupational allocation following improvements in enforcement.

Key Contributions. This paper makes three key contributions. First, it provides a quantitative assessment of the role of credit contract enforcement in shaping occupational allocation and income disparities across Indian states by combining a calibrated general-equilibrium model with quasi-experimental evidence from a major judicial reform; judicial data on civil case resolution are used to discipline enforcement frictions, establishing a direct institutional link between legal performance and aggregate economic outcomes. Second, the model distinguishes between voluntary and involuntary entrepreneurship: unlike Buera et al. (2020), where involuntary entrepreneurship arises from low labor productivity that makes wage employment unattractive, involuntary entrepreneurship here is driven by binding labor-market constraints that preclude access to wage employment altogether.This distinction reflects labor-surplus conditions typical of developing economies and implies a larger and more persistent mass of undercapitalized firms, thereby amplifying the aggregate consequences of weak credit contract enforcement. Third, the paper studies an extension with nationally integrated capital markets and a common interest rate, showing that differences in credit contract enforcement can generate larger regional disparities when capital is mobile.

This paper relates to several strands of the quantitative macro-development literature emphasizing the role of credit contract enforcement in shaping aggregate outcomes. Buera et al. (2011) embed imperfect enforcement in a general-equilibrium model with heterogeneous entrepreneurs and show that borrowing constraints lead to severe capital misallocation and persistent income gaps, while Antunes et al. (2008) demonstrate that improvements in enforceability expand entrepreneurial activity and raise output. Buera and Shin (2013) further show that weak enforcement can generate history-dependent misallocation with long-lasting effects. Buera et al. (2020) introduce necessity (involuntary) entrepreneurship, it arises when low labor productivity makes wage employment unattractive; in contrast, this paper models involuntary entrepreneurship as the outcome of binding labor-market constraints that preclude wage employment altogether.

Empirically, a large literature documents the importance of legal enforcement for credit access and firm outcomes. Cross-country studies show that weaker investor protection and judicial enforcement are associated with shallower financial markets (La Porta et al., 1997; Gropp et al., 1997). Within India, Lilienfeld-Toal et al. (2012b) show that the introduction of Debt Recovery Tribunals increased borrowing and investment but also raised equilibrium interest rates, with heterogeneous effects across firms. Chemin (2012) demonstrate that the 2002 Civil Procedure Code (CPC) reform improved credit access among informal enterprises, while Ponticelli and Alencar (2014) and Rajan and Ramcharan (2020) further document how judicial efficiency affects credit reallocation and firm dynamics.

Relatedly, a growing empirical literature studies how financial frictions shape occupational sorting. Levine and Rubinstein (2018) estimate a multinomial logit model of occupational choice and show that human capital and liquidity constraints jointly determine selection into entrepreneurship and wage work. Building on this framework, I combine a similar occupational choice structure with a difference-in-differences strategy exploiting cross-state variation in judicial efficiency induced by the 2002 CPC Amendment Act. This approach allows me to micro-found and estimate how improvements in credit contract enforcement translate into changes in occupational composition.

The remainder of the paper is organized as follows. Section 2 presents the model. Section 3 describes the calibration and quantitative results. Section 4 presents the empirical analysis. Section 5 concludes.

2 The Model

This section develops a dynamic general-equilibrium model with heterogeneous agents in which credit contract enforcement frictions distort occupational choice and firm scale, generating mea-

surable effects on total factor productivity and per capita output. The model features three key elements: agents sort into one of three occupational categories—voluntary entrepreneurship, involuntary (necessity) entrepreneurship, or wage employment; borrowing constraints are endogenous and depend on state-specific enforcement efficiency, denoted by ϕ; and labor-market frictions, captured by χ, restrict access to wage employment and give rise to involuntary entrepreneurship. Each state is modeled as a closed economy with its own labor and capital markets.

The economy is populated by a continuum of infinitely lived individuals of measure N. In each period, individuals consume, save, and earn income either by operating a firm or by supplying labor to other firms. Production takes place in firms operated by entrepreneurs, who may be classified as voluntary or involuntary. All firms produce a homogeneous good, which is consumed by individuals and whose price is normalized to one. Entrepreneurs demand capital and labor to operate their firms, while workers supply labor. Individual asset holdings collectively constitute the supply of capital, which is rented to firms through a competitive capital market. The economy features three markets—goods, labor, and capital—which clear competitively each period. The economy is geographically segmented into states. In the baseline model, each state is modeled as a closed economy: labor and capital markets clear within states, and individuals participate only in the markets of their own state.

Every period, individuals receive a draw of a two-dimensional vector $\mathbf{z} = \{z, \ell\}$, where z represents entrepreneurial productivity, $\ell \in \{0, 1\}$ indicates access to wage employment. log(z) follows an AR(1) process with persistence ρ and variance of error term σ. ℓ captures exogenous frictions in access to wage employment, allowing the model to distinguish between opportunity-driven and necessity-driven entrepreneurship—an empirically salient feature of the Indian economy characterized by labor surplus and limited job creation. With probability χ, $\ell = 1$ and the individual can find a wage job; with probability $1 - \chi$, $\ell = 0$ and the individual cannot find wage work. Individuals choose savings and occupational status each period to maximize the expected discounted sum of utility over an infinite horizon. Individuals who choose to operate firms each period rent capital and hire labor optimally, subject to credit enforcement frictions. In addition to households and firms, the economy features competitive financial intermediaries—such as banks—that accept deposits from households and rent capital to firm owners.

Subsections 2.1 and 2.2 describe the model's structure in detail, while Subsection 2.3 discusses the core mechanisms that drive the model's results. Subsection 2.4 discusses the model extension of 2 states with a common capital market.

2.1 Individual's Optimization Problem

2.1.1 Preferences, Technology, and Credit Enforcement

The economy is populated by infinitely lived individuals who choose consumption sequences $\{c_t\}_{t=0}^{\infty}$ to maximize expected lifetime utility,

$$U = \mathbb{E} \sum_{t=0}^{\infty} \beta^t u(c_t), \tag{1}$$

where period utility is given by

$$u(c_t) = \frac{c_t^{1-\gamma} - 1}{1-\gamma}. \tag{2}$$

Here, $\beta \in (0,1)$ is the discount factor and γ denotes the coefficient of relative risk aversion.

Each period, individuals choose an occupation that determines their income. A labor-market opportunity shock $\ell \in \{0,1\}$ governs access to wage employment. When $\ell = 1$, individuals may choose between wage employment (W) and firm operation (F); when $\ell = 0$, wage employment is unavailable and individuals must operate a firm. Let $o(a,z,\ell) \in \{W,F\}$ denote the occupational choice as a function of individual states. All workers supply one unit of labor and earn a common wage w.

Individuals who operate firms renting capital k and hiring labor l produce output according to

$$f(k,l,z) = zk^{\alpha}l^{\theta}, \tag{3}$$

where z denotes entrepreneurial productivity and $\alpha + \theta < 1$ implies decreasing returns to scale. Firm profits are given by

$$\pi(k,l;R,w,z) = zk^{\alpha}l^{\theta} - Rk - wl, \tag{4}$$

where R is the rental rate of capital.

Entrepreneurs are classified as *voluntary* if profits exceed the wage w, and as *involuntary* otherwise.

If an individual chooses firm operation ($o = F$), she rents capital k and hires labor l to maximize profits, subject to credit enforcement frictions described below. Let $k(a,z,\ell)$ and $l(a,z,\ell)$ denote the resulting optimal input choices. If the individual chooses wage employment ($o = W$), capital and labor demand are zero by definition:

$$k(a,z,\ell) = l(a,z,\ell) = 0 \quad \text{if } o(a,z,\ell) = W.$$

Capital is intermediated by competitive financial institutions that collect deposits from individuals at interest rate r and rent capital to firms at rate R. Intermediaries earn zero profits, implying

$$R = r + \delta, \tag{5}$$

where δ is the depreciation rate of capital. Individuals cannot hold negative assets, so $a \geq 0$.

Credit contracts are imperfectly enforced. The parameter $\phi \in [0, 1]$ captures the degree of contract enforcement, with higher values indicating stronger enforcement. When enforcement is imperfect ($\phi < 1$), entrepreneurs may renege on their credit obligations and retain a fraction $(1-\phi)$ of revenues net of labor payments and undepreciated capital, forfeiting their collateral assets a. To deter default, financial intermediaries impose a borrowing limit $\bar{k}(a, z, \phi)$ that satisfies the incentive compatibility constraint

$$\max_l\{zk^\alpha l^\theta - wl\} - Rk + a(1+r) \geq (1-\phi)\left[\max_l\{zk^\alpha l^\theta - wl\} + (1-\delta)k\right]. \tag{6}$$

This incentive-compatibility constraint follows the standard limited-enforcement framework in which borrowers can default and retain a fraction of output, implying endogenous collateral-based borrowing limits (Buera et al. (2011)). The constraint implies that the maximum capital rented to a firm is increasing in collateral assets a, entrepreneurial productivity z, and enforcement quality ϕ.

2.1.2 Individual Optimization Problem

Individuals choose consumption, savings, and occupation to maximize lifetime utility as defined in equation (2). At the beginning of each period, an individual observes the state (a, z, ℓ), where a denotes asset holdings, z entrepreneurial productivity, and $\ell \in \{0, 1\}$ indicates access to wage employment. Individuals then choose next period's assets a' and an occupation.

Let $v(a, z, \ell)$ denote the value function. When $\ell = 1$, individuals can choose between wage work and firm operation; when $\ell = 0$, wage employment is unavailable and individuals must operate a firm. The value function is therefore

$$v(a, z, \ell) = \max\{v^W(a, z, \ell), v^F(a, z, \ell)\}\mathbf{1}\{\ell = 1\} + v^F(a, z, \ell)\mathbf{1}\{\ell = 0\}. \tag{7}$$

The value of wage work satisfies

$$v^W(a, z, \ell) = \max_{c, a' \geq 0}\left\{u(c) + \beta\mathbb{E}_{z', \ell'}[v(a', z', \ell')]\right\} \tag{8}$$

subject to

$$c + a' \leq w + (1 + r)a. \tag{9}$$

The value of firm operation satisfies

$$v^F(a, z, \ell) = \max_{c,a',k,l \geq 0} \left\{ u(c) + \beta \mathbb{E}_{z',\ell'}[v(a', z', \ell')] \right\} \tag{10}$$

subject to

$$c + a' \leq z k^\alpha l^\theta - Rk - wl + (1 + r)a, \tag{11}$$

and the enforcement-induced borrowing constraint

$$k \leq \bar{k}(a, z, \phi). \tag{12}$$

Occupational choice is static conditional on prices. When $\ell = 1$, individuals choose firm operation if contemporaneous profits exceed the wage w and wage work otherwise; such firm operators are referred to as *voluntary entrepreneurs*. When $\ell = 0$, individuals must operate a firm; if profits fall below w, they are classified as *involuntary entrepreneurs*. Firm owners rent capital and hire labor each period to maximize static profits.

Let (k^u, l^u) denote unconstrained profit-maximizing inputs and (k^o, l^o) denote optimal inputs under imperfect enforcement. The borrowing constraint implies

$$k^o = \min\{k^u, \bar{k}(a, z, \phi)\}, \tag{13}$$

with l^o chosen optimally given k^o.

2.2 Stationary Competitive Equilibrium

A stationary competitive equilibrium consists of an invariant distribution $G(a, z, \ell)$ over individual states, policy functions $\{a'(a, z, \ell), o(a, z, \ell), k(a, z, \ell), l(a, z, \ell)\}$, borrowing limits $\bar{k}(a, z, \phi)$, and prices (w, R, r) such that:

(i) Given prices (w, R, r) and borrowing limits $\bar{k}(a, z, \phi)$, individual policy functions solve the optimization problem defined in equations (8)–(13).

(ii) The capital market clears:

$$\int k(a, z, \ell)\, dG(a, z, \ell) = \int a\, dG(a, z, \ell). \tag{14}$$

(iii) The labor market clears:

$$\int l(a,z,\ell)\,dG(a,z,\ell) = \int \mathbf{1}\{o(a,z,\ell) = W\}\,dG(a,z,\ell). \tag{15}$$

2.3 Model Mechanisms

This section describes the model mechanisms linking credit contract enforcement to occupational choice, firm scale, resource allocation, and aggregate outcomes. The key parameter of interest is ϕ, which governs the enforceability of credit contracts and therefore the extent to which entrepreneurs can rent capital against collateral. A higher ϕ relaxes borrowing constraints, allowing productive but asset-poor individuals to operate at larger scale.

In partial equilibrium, holding prices fixed, improved enforcement expands access to capital and raises firm size, enabling some individuals who would otherwise be workers or involuntary entrepreneurs to enter voluntary entrepreneurship. Capital and labor are reallocated toward higher-productivity firms, improving allocative efficiency.

In general equilibrium, these individual responses increase aggregate demand for capital and labor, raising both the interest rate and the wage. The increased input prices, along with higher wages increasing the profitability threshold required to operate a voluntary firm, cause marginal voluntary entrepreneurs to exit. Because access to wage employment is probabilistic, some of these individuals become workers, while others operate as involuntary entrepreneurs. As a result, general equilibrium price adjustments overturn the partial equilibrium expansion of voluntary entrepreneurship and generate a compositional shift toward larger, more productive firms alongside an increase in involuntary entrepreneurship and workers.

Together, these forces raise output per capita and capital per capita while reducing misallocation by reallocating resources toward high-ability entrepreneurs. The remainder of this section formalizes these mechanisms by first examining partial equilibrium effects and then characterizing the general equilibrium feedback through wages and interest rates.

2.3.1 Partial Equilibrium effects of ϕ

We begin by analyzing the effects of credit contract enforcement ϕ in partial equilibrium, holding wages w and interest rates r fixed. This isolates the direct impact of enforcement on individual decisions absent feedback from aggregate factor markets.

An increase in ϕ relaxes borrowing constraints, allowing entrepreneurs to rent more capital

and hire more labor. As a result, firm scale expands and profits rise for productive but asset-poor individuals. At fixed prices, the lowering of collateral required to operate a firm profitably induces entry into voluntary entrepreneurship among individuals who would otherwise be workers or involuntary entrepreneurs. Capital and labor are reallocated toward higher-productivity firms, improving allocative efficiency.

Changes in enforcement also affect savings decisions. Higher ϕ raises firm profits and income for firm owners, generating an income effect that increases saving. At the same time, when enforcement is weak, productive but asset-poor individuals face tight collateral constraints and therefore have strong incentives to accumulate assets in order to relax future borrowing constraints. As a result, the net effect of increasing ϕ on savings is ambiguous and depends on proximity to the borrowing constraint.

Figure A1 illustrates the resulting occupational choice regions under fixed prices. A detailed discussion of the underlying policy functions is provided in Appendix A.1.

2.3.2 General-Equilibrium Effects of ϕ

We now turn to the general-equilibrium effects of changes in credit contract enforcement. At the stationary equilibrium, the interest rate r and wage w jointly clear the capital and labor markets. Aggregate demand for capital and labor equals the sum of firm-level input demands, while aggregate capital supply equals total asset holdings and aggregate labor supply equals the mass of individuals choosing wage employment.

An increase in ϕ relaxes borrowing constraints, allowing entrepreneurs to rent more capital and operate at a larger scale. At given prices, this raises aggregate demand for both capital and labor and induces some individuals to switch from wage employment to firm operation, thereby reducing labor supply. On the capital-supply side, higher enforcement affects aggregate saving through two opposing forces: higher incomes raise saving, while weaker collateral-accumulation incentives reduce saving. The net effect on capital supply is therefore ambiguous. In equilibrium, the expansion in factor demand dominates these supply-side adjustments, leading to higher interest rates and wages as ϕ rises.

Figure A2 in Appendix A.2 illustrates the general-equilibrium occupational choice policy functions underlying these mechanisms. General-equilibrium price adjustments generate opposing forces on occupational choice as interest rates and wages rise with improved enforcement. The impact is heterogeneous across individuals. Improved enforcement relaxes borrowing constraints on capital and allows high-ability, asset-poor individuals to expand firm scale and enter voluntary entrepreneurship, even though input prices rise and higher wages increase the profitability threshold

for voluntary entrepreneurship. For low-ability individuals—whose unconstrained optimal capital demand is already limited—the rise in input prices can outweigh the benefits of loosening of borrowing constraint, inducing some marginal voluntary entrepreneurs to exit. As a result, the share of voluntary entrepreneurs may decline as ϕ increases, even as their average productivity, scale, and profitability rise. Exiting voluntary entrepreneurs reallocate into wage employment when labor-market access is available and into involuntary entrepreneurship otherwise, generating a compositional shift toward fewer but more productive voluntary entrepreneurs alongside an expansion in the shares of workers and involuntary entrepreneurs.

Table 1 quantifies these general-equilibrium reallocations across different values of ϕ. As credit contract enforcement improves, both the equilibrium interest rate and wage increase, reflecting stronger aggregate demand for capital and labor. Output per capita rises monotonically with ϕ, accompanied by a substantial expansion in capital per capita, indicating a pronounced reduction in misallocation as resources are reallocated toward more productive entrepreneurs. At the same time, the share of voluntary entrepreneurs declines with higher ϕ, while the shares of workers and involuntary entrepreneurs increase. Despite this decline in participation, the mean talent of voluntary entrepreneurs rises with ϕ, highlighting productivity gains associated with improved enforcement.

Table 1: Impact of Credit Contract Enforcement (ϕ): General Equilibrium

	ϕ					
	0	0.2	0.4	0.6	0.8	1.0
Interest Rate (r)	0.00	0.00	0.00	0.03	0.06	0.07
Wage (w)	1.86	2.26	2.65	3.17	3.83	3.96
Output per Capita (Y)	3.25	3.97	4.96	5.98	7.19	7.34
Voluntary entrepreneurs	3.19	3.86	4.83	5.77	7.04	7.21
Involuntary entrepreneurs	0.06	0.11	0.13	0.21	0.15	0.13
Capital per Capita (K)	2.60	3.51	5.41	8.49	14.56	15.82
Worker Share (L)	0.54	0.57	0.58	0.60	0.60	0.60
Share of Voluntary Entrepreneurs	0.12	0.08	0.07	0.04	0.04	0.04
Share of Involuntary Entrepreneurs	0.33	0.35	0.35	0.36	0.36	0.36
Mean Talent (Voluntary Entrepreneurs)	5.48	6.65	7.38	12.03	12.03	12.03

Notes: The table reports general equilibrium outcomes as credit contract enforcement (ϕ) varies. All parameters apart from ϕ are calibrated as in Table 2.

The baseline model assumes that capital markets clear at the state level, so that interest rates

are determined locally. I now extend the model to allow for partial financial integration across states through a common capital market.

2.4 Model Extension - Common Capital Market and Shared Interest Rate

To explore the implications of financial integration across states, I extend the model to a setting with two states that share a common capital market. In this environment, capital markets are nationally integrated and face a uniform equilibrium interest rate r, determined by the joint supply and demand for capital across both regions, while labor markets continue to clear at the state level.

This setup represents partial financial integration. Firms are geographically immobile—they hire labor and produce only within their home state—but they can borrow from a shared pool of credit supplied by national financial intermediaries. Savers in either state deposit funds into the integrated financial system, and capital is allocated across regions according to expected returns, equalizing the equilibrium interest rate across states.

Differences in enforcement quality generate asymmetric capital flows. In states with weaker credit contract enforcement, lower effective returns to lending induce capital outflows, raising the local cost of borrowing relative to autarky. Conversely, stronger enforcement attracts capital inflows, lowering borrowing costs and expanding credit availability. In the integrated equilibrium, the common interest rate lies between the two autarkic rates, reallocating capital toward jurisdictions with better enforcement institutions.

Tables B1 and B2 on appendix B illustrate these dynamics. In the tables, ϕ_1 refers to the degree of credit contract enforcement of State 1, whereas ϕ_2 refers to the degree of credit contract enforcement of State 2. Table B1 reports outcomes of State 1 when the partner state, State 2, has very weak enforcement ($\phi_2 = 0$), while Table B2 reports outcomes of State 1 in the case where the partner state, State 2, has very strong enforcement ($\phi_2 = 1$). Relative to the autarkic benchmark in Table 1, the equilibrium interest rate is systematically lower for all values of ϕ when the partner state has weaker enforcement, and systematically higher when the partner state has stronger enforcement.

In the strong-enforcement state, lower borrowing costs enable productive entrepreneurs to expand firm scale, increasing both aggregate capital and output. Easier access to credit also encourages entry by moderately talented individuals, raising the share of voluntary entrepreneurs while reducing their average talent. Worker and involuntary entrepreneurship shares decline relative to autarky as individuals reallocate into voluntary firm operation. In contrast, the weak-enforcement state experiences higher borrowing costs under integration. Voluntary entrepreneurship contracts, capital per capita and output decline, and a larger share of individuals remain in wage employment

or involuntary entrepreneurship. Among remaining voluntary entrepreneurs, average talent rises sharply, reflecting stronger selection under tighter financial conditions.

Overall, financial integration amplifies cross-state divergence in capital allocation and income. Capital flows toward regions with stronger enforcement institutions, increasing output and firm scale there, while weaker-enforcement states experience reduced investment and entrepreneurial activity. This extension highlights how institutional heterogeneity interacts with integrated capital markets to shape regional inequality and occupational outcomes.

3 Quantitative Analysis

This section presents the calibration strategy and quantitative results. The key parameter of interest for explaining cross-state disparities in income is the degree of credit contract enforcement, ϕ, which is allowed to vary across Indian states. All other model parameters are held constant across states.

I first describe the calibration of the common national parameters, followed by the procedure used to identify the state-specific enforcement parameter ϕ. I discipline ϕ using two alternative calibration strategies.

In the results subsection, I compare the model's predictions for key outcomes to their empirical counterparts. I assess the extent to which cross-state variation in ϕ can account for observed differences in per capita income.

3.1 Calibration

I assume that all model parameters other than ϕ are common across Indian states. These common, or "national," parameters include the technology parameters α and θ; the AR(1) parameters governing entrepreneurial productivity, (ρ, σ); the discount factor β; the coefficient of relative risk aversion γ; the depreciation rate δ; and the labor-opportunity parameter χ.

Among these parameters, the values of γ and δ are taken from the existing literature. The discount factor β and the persistence parameter ρ are set to 0.92 and 0.9, respectively, consistent with standard values in the macroeconomic literature. The technology parameters α and θ are set equal to the capital and labor income shares in India in 2017–18, based on data from the National Accounts Statistics (NAS). The remaining parameters, χ and σ, are calibrated internally by matching model-generated moments to their empirical counterparts. Specifically, χ is chosen to match the share of workers in the labor force,[1] while σ is chosen to match the standard deviation

[1]Source: Periodic Labour Force Survey (PLFS), 2017–18.

of log voluntary entrepreneur firm size.[2] These moments are matched conditional on setting ϕ such that the model reproduces India's external finance-to-GDP ratio.[3]

Table 2 reports the values of all national parameters, along with the corresponding data moments and their model counterparts for the calibrated parameters.

Table 2: National Parameters

Parameter	Value	Target / Source	Model	Data
Directly set from National Accounts (data-imposed)				
α	0.28	Capital income share in GDP (NAS 2017–18)	—	
θ	0.32	Wage income share in GDP (NAS 2017–18)	—	
Disciplined by explicit targets				
χ	0.62	Share of workers (PLFS 2017–18)	0.57	0.57
σ	0.75	SD of log firm size (ASI 2017–18)	1.3	1.5
Set from literature / Conventional values				
ρ	0.90	Conventional in macro/firm dynamics	—	
β	0.92	Buera et al. (2011)	—	
γ	1.50	Standard CRRA	—	
δ	0.06	Standard depreciation	—	

I calibrate the state-level enforcement parameter, ϕ_S, using two complementary approaches. The first approach maps ϕ_S directly from judicial efficiency data, capturing cross-state institutional variation in contract enforcement. The second approach infers ϕ_S by matching the model-implied external finance–to–GDP ratio to its empirical counterpart and subsequently examines its relationship with judicial efficiency measures. Taken together, these approaches provide both an institutionally grounded and a quantitatively disciplined assessment of the role of enforcement in shaping financial access and income disparities across states.

The calibration focuses on 21 major Indian states for which consistent data on judicial performance and bank credit are available.[4]

[2]Source: Annual Survey of Industries (ASI), 2017–18.The Annual Survey of Industries (ASI) covers registered manufacturing establishments under the Factories Act, 1948—units employing 10 or more workers with power or 20 or more without power. These firms hire labor, maintain accounts, and operate at commercial scale, making them a suitable empirical proxy for voluntary entrepreneur-owned firms in the model.

[3]External finance is measured as total bank credit to the private sector relative to GDP.

[4]The North-Eastern states of Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, and Sikkim are excluded from the quantitative analysis due to limited coverage in industrial and judicial datasets. Their small manufacturing base, low formal credit penetration, and incomplete reporting in the National Judicial Data Grid (NJDG) make consistent calibration of enforcement quality and credit intensity infeasible. Union Territories are also not included.

Judicial efficiency is proxied by the average age of disposed civil suit cases in district and sessions courts across Indian states in 2018, as reported in the National Judicial Data Grid (NJDG). The NJDG compiles real-time information on case filing, pendency, and disposal across courts in India. Focusing on civil suit cases is appropriate, as these disputes frequently involve contract enforcement and debt recovery, which are directly relevant for firm's access to credit. A higher average age reflects slower judicial processes and weaker enforcement, while a lower value indicates faster case resolution and stronger contract enforcement.[5]

Approach 1: Judicial-Efficiency Mapping. In the baseline calibration, ϕ_S is derived directly from observed judicial efficiency. Specifically, I map the average duration of civil case disposal in district and subordinate courts to enforcement using a logistic functional form,

$$\phi_S = \frac{1}{1 + e^{(\alpha + \beta \, disposal\_time_S)}},$$

where $disposal\_time_S$ is the average age (in years) of civil cases disposed in district and subordinate courts in state S in 2018. Lower disposal times indicate faster judicial resolution and stronger credit contract enforcement.

The parameters (α, β) are identified using two empirical anchors. I select one state with relatively low judicial disposal time (fast courts) and one with relatively high disposal time (slow courts), and assign them target enforcement levels $(\bar{\phi}_H, \bar{\phi}_L)$ close to the highest and lowest values of calibrated ϕ_S obtained in Approach 2. Given the observed judicial disposal times (d_H, d_L) for these two states, the parameters (α, β) are solved from the system of equations implied by the logistic mapping,

$$\bar{\phi}_H = \frac{1}{1 + \exp(\alpha + \beta d_H)}, \qquad \bar{\phi}_L = \frac{1}{1 + \exp(\alpha + \beta d_L)}. \tag{16}$$

This system exactly identifies (α, β). The resulting parameter values then determine the implied enforcement levels ϕ_S for all states as a smooth, monotonic function of judicial disposal time.[6]

Specifically, I set $\alpha = -1.04$ and $\beta = 0.55$ such that $\phi_{\text{Haryana}} = 0.5$ at a judicial disposal time of 1.89 years and $\phi_{\text{Bihar}} = 0.1$ at a judicial disposal time of 5.9 years.

Table C1 reports the resulting state-level enforcement parameters implied by this mapping.

Approach 2: Matching Model-Implied External Finance. As a complementary strategy, I also calibrate ϕ_S by matching the model-generated ratio of external finance to GDP to its empirical

[5] District and sessions courts account for approximately 87.5 percent of all pending cases in India, making their disposal speed a representative proxy for state-level judicial efficiency.

[6] The logistic specification ensures a smooth, monotonic mapping bounded on $(0, 1)$ and allows flexible curvature. Alternative functional forms, such as exponential decay, offer less control over slope and asymptotic behavior.

counterpart for each state. In the model, aggregate external finance is defined as

$$\int (k - a) \cdot \mathbf{1}(k > a)\, da\, dz,$$

where $(k - a)$ denotes net borrowing by an individual and $\mathbf{1}(k > a)$ is an indicator equal to one when the individual borrows.

Empirically, external finance is measured as the sum of credit extended by scheduled commercial banks and regional rural banks relative to state GDP.[7] Data on bank credit and state GDP are obtained from the *RBI Handbook of Statistics on Indian States* for the year 2017–18.[8] Table C2 reports the calibrated values of ϕ_S obtained from this approach.

3.2 Results

Table 3 reports the model-predicted outcomes for GDP per capita,[9] external finance-to-GDP, and the average size of voluntary firms across states, alongside their empirical counterparts for 2017–18. These results correspond to the baseline calibration under Approach 1, in which the enforcement parameter ϕ_S is mapped directly from observed judicial efficiency, proxied by the average duration of civil case disposal.

Firm size is measured as the number of workers employed directly by the firm. Firms covered in the Annual Survey of Industries (ASI) are treated as representative of voluntary entrepreneur-owned firms in the data.[10] External finance-to-GDP is measured empirically as the sum of credit extended by scheduled commercial banks and regional rural banks relative to state GDP.

To quantify the contribution of credit contract enforcement in explaining income disparities across Indian states, I regress observed GDP per capita on model-predicted GDP per capita. The resulting positive relationship yields an R^2 of 0.06, indicating that cross-state differences in the enforcement parameter ϕ account for approximately 6 percent of the variation in GDP per capita.

As a validation exercise, I examine whether the model calibrated under Approach 1 reproduces cross-state variation in financial depth (external-finance to GDP ratio) and firm size observed in the

[7] This measure captures the dominant sources of formal credit at the state level in India. Other sources of external finance, such as non-banking financial companies (NBFCs), cooperative banks, and capital-market instruments, are excluded due to the lack of consistent state-level data.

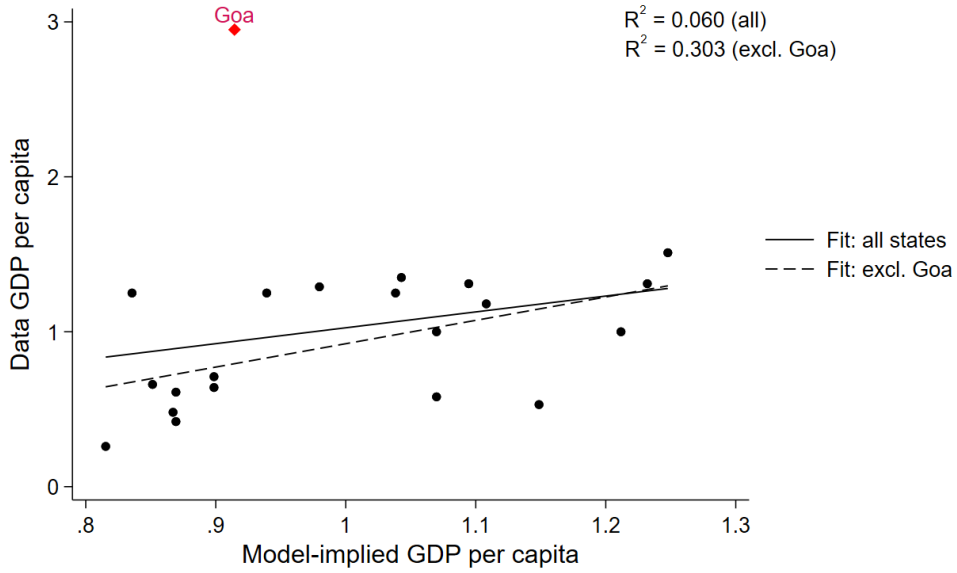
[8] `https://m.rbi.org.in/Scripts/AnnualPublications.aspx?head=Handbook+of+Statistics+on+Indian+States`

[9] State-level GDP data are drawn from the RBI Handbook of Statistics on Indian States.

[10] The Annual Survey of Industries (ASI) covers registered manufacturing establishments under the Factories Act, 1948—units employing 10 or more workers with power or 20 or more without power. These firms hire labor, maintain accounts, and operate at commercial scale, making them a suitable empirical proxy for voluntary entrepreneur-owned firms in the model. In contrast, own-account and household enterprises below these thresholds, typically representing subsistence self-employment, are covered in the National Sample Survey (NSS) unorganized-sector rounds.

data. Figures 2a and 2b show positive correlations between model-implied and observed external finance-to-GDP ratios (financial depth) and average firm sizes, respectively.

Figure 1: Predicted vs Observed Output per capita (Approach 1)



Note: Values on both axes are re-scaled with the mean normalized to 1. Goa appears as an outlier with observed output per capita substantially above model predictions.

These quantitative results are consistent with the model's core mechanism linking credit contract enforcement to aggregate productivity through the easing of borrowing constraints and the reallocation of resources. Higher enforcement relaxes collateral constraints. At the same time, it generates general-equilibrium feedbacks. Higher demand for labor and capital raises equilibrium wages and interest rates, altering firm's entry and scale decisions. More productive entrepreneurs expand as borrowing constraints loosen, while marginal or low-productivity firms contract or exit in response to higher input prices. The resulting reallocation shifts resources toward larger and more efficient enterprises, increasing aggregate productivity even without an increase in the total number of firms. Consistent with this mechanism, states with stronger enforcement and faster judicial systems exhibit both higher per-capita income and larger firm sizes in the data, and the positive correlation between model-implied and observed external finance-to-GDP ratios further validates the calibration.

When the model is solved using the alternative calibration under Approach 2—where ϕ_S is inferred by matching the model-generated external finance-to-GDP ratio to its data counterpart—the results are qualitatively similar. A regression of observed GDP per capita on model-predicted values yields an R^2 of 0.035, indicating that cross-state differences in ϕ account for approximately

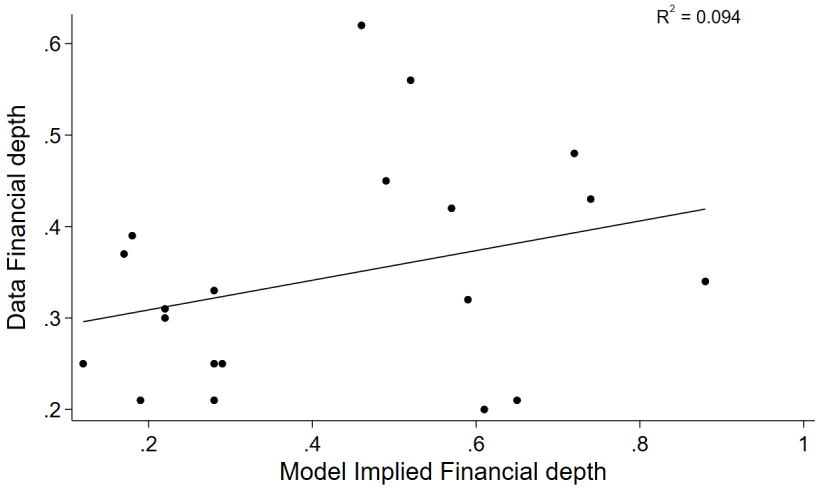
Table 3: Model-Predicted Outcomes vs. Data (Approach 1)

	ϕ_S	Y^*_{Model}	Y^*_{Data}	External Finance/GDP (Model)	Bank Credit (Commercial+ Regional Rural)/GDP (Data)	Avg. Voluntary Firm Size* (Model)	Avg. Voluntary Firm Size* (Data – ASI)
Andhra Pradesh	0.38	1.07	1.00	0.57	0.42	1.09	0.96
Assam	0.42	1.15	0.53	0.65	0.21	1.10	0.64
Bihar	0.10	0.82	0.26	0.12	0.25	0.61	0.19
Chhattisgarh	0.17	0.87	0.61	0.22	0.31	0.72	0.84
Goa	0.22	0.91	2.95	0.29	0.25	0.95	0.72
Gujarat	0.13	0.84	1.25	0.17	0.37	0.67	1.23
Haryana	0.50	1.25	1.51	0.88	0.34	2.43	1.11
Himachal Pradesh	0.40	1.11	1.18	0.61	0.20	1.16	0.99
Jharkhand	0.15	0.87	0.48	0.19	0.21	0.62	1.03
Karnataka	0.34	1.04	1.35	0.49	0.45	1.06	1.70
Kerala	0.46	1.23	1.31	0.74	0.43	1.11	0.89
Madhya Pradesh	0.38	1.07	0.58	0.59	0.32	1.09	1.00
Maharashtra	0.25	0.94	1.23	0.34	1.03	0.99	0.96
Odisha	0.21	0.90	0.64	0.28	0.25	0.94	0.93
Punjab	0.45	1.21	1.00	0.72	0.48	1.11	1.20
Rajasthan	0.21	0.90	0.71	0.28	0.33	0.94	0.89
Tamil Nadu	0.35	1.04	1.25	0.72	0.56	1.05	1.63
Telangana	0.29	0.98	1.29	0.28	0.62	1.03	0.67
Uttar Pradesh	0.17	0.87	0.42	0.53	0.30	0.72	0.89
Uttarakhand	0.37	1.09	1.31	0.53	0.21	1.09	1.21
West Bengal	0.14	0.85	0.66	0.53	0.39	0.62	1.31

Notes: * Re-scaled values, mean value set to 1. Calibrated ϕ_S from a logistic fit using Bihar (low) and Haryana (high) as reference points.

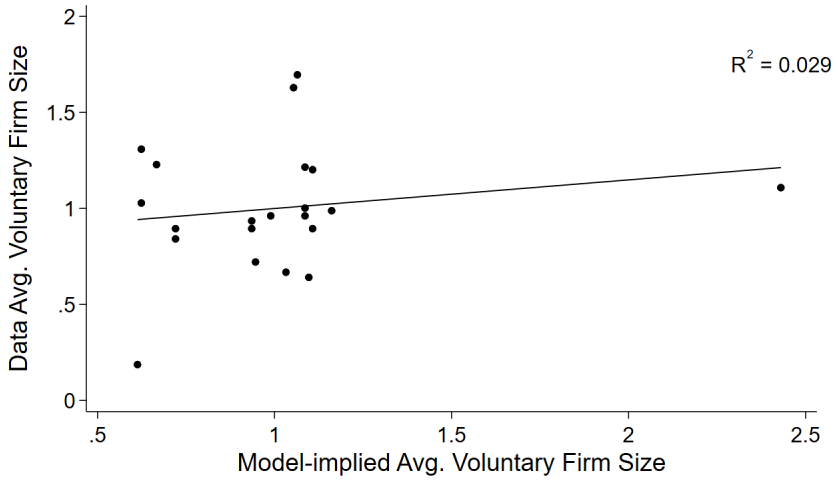
Figure 2: Predicted vs Observed Credit-to-GDP and Voluntary Firm Size (Approach 1)

(a) Predicted vs Observed Credit-to-GDP



Note: Financial depth is measured as external finance-to-GDP in both the model and the data. In the data, external finance is defined as the sum of credit extended by scheduled commercial banks and regional rural banks relative to state GDP.
Maharashtra, which has a disproportionately high credit-to-GDP ratio due to the concentration of national headquarters and financial institutions, has been excluded from this scatterplot.

(b) Predicted vs Observed Avg. Voluntary Firm Size



Note: Values on both axes are re-scaled, mean set to 1.
Firm Size is measured as no. of workers employed directly by the firm. Source: Annual Survey of Industries

3.5 percent of the variation in per-capita income. Likewise, the correlation between model-implied and observed average firm sizes remains positive, reinforcing the consistency of the enforcement mechanism across calibration strategies (see Figures C1 and C2a).

Finally, I assess the relationship between the calibrated state-level enforcement parameters in Approach 2 and judicial efficiency. Table C4 reports state-wise data on the average age of disposed civil suit cases in district and sessions courts in 2018 and Figure C2b is a scatter plot of the same. The correlation between the two is negatively at 0.25, indicating that states with shorter case disposal times tend to exhibit higher calibrated enforcement parameters. This relationship supports the interpretation of ϕ_S as capturing meaningful cross-state variation in credit contract enforcement. [11]

While the qualitative patterns under Approaches 1 and 2 are broadly similar, minor differences arise from the distinct sources used to discipline enforcement. Approach 1 directly maps ϕ_S from judicial efficiency, anchoring enforcement in observable institutional variation. In contrast, Approach 2 infers ϕ_S from observed bank-credit intensity. Because the empirical measure of external finance is restricted to bank credit—excluding other channels such as non-banking financial institutions, cooperative credit, and capital-market instruments—it may not fully capture the underlying enforcement environment. As a result, the distribution of ϕ_S and its explanatory power for income variation differ modestly across the two approaches. Nevertheless, the strong qualitative consistency across both exercises underscores the robustness of the model's central mechanism linking effective credit contract enforcement to improved allocation and higher aggregate productivity.

4 Judicial Speed and Occupational Choice: Empirical Evidence

This section provides empirical evidence on the effect of judicial enforcement on individual's occupational choices. The speed of resolution of civil cases by courts serves as a practical and observable proxy for the enforcement of credit contracts. I employ a difference-in-differences (DiD) strategy that exploits cross-state variation in implementation of the 2002 Code of Civil Procedure (CPC) Amendment Act, following Chemin (2012). The reform introduced procedural changes intended to accelerate civil litigation in India, and its effects are expected to apply to credit contract disputes, which are adjudicated in the same civil courts.

Subsection 4.1 describes the characteristics and definitions of the three occupation types. Sub-

[11] Judicial efficiency is a key determinant of credit contract enforcement, as faster case resolution strengthens the credibility and timeliness of legal recourse available to lenders. Enforcement outcomes may also depend on complementary institutional features—such as judgment execution, governance quality, and informal enforcement mechanisms—as well as credit-market characteristics including banking depth, information infrastructure, and lender competition.

section 4.2 outlines the identification strategy. Subsection 4.3 details the datasets and variable construction. Subsection 4.4 presents the empirical model. Subsection 4.5 reports the regression results.

4.1 Occupation Type Categorization

In this subsection, I discuss the definitions and key characteristics of the three occupation types: voluntary entrepreneurs, involuntary entrepreneurs, and workers.

Voluntary entrepreneurs are the traditional entrepreneurs—the epitome of "modern capitalist development", the "agents of innovation", the disruptive economic leaders (Schumpeter (1911)) who undertake costly and risky investments (Knight (1921)) and develop new goods, services, and production processes (Schumpeter (1911)). They shape the productivity of firms (Murphy et al. (1991)), facilitate economic growth and create jobs.

The notion of involuntary entrepreneurship builds on Lewis's mid-1950s account of surplus labor in developing economies, where many individuals engaged in low-productivity self-employment due to limited alternatives. Tokman (2007) similarly argues that such entrepreneurship reflects "a failure of the economic system to create enough productive employment" suggesting that many would prefer salaried jobs if available. Empirical evidence from De Mel et al. (2010) shows that these entrepreneurs have significantly lower ability and cognitive skill scores than owners of larger firms, highlighting their relatively low human capital.

The third occupational category is worker, defined as individuals employed in the enterprises of others and earning a fixed wage or salary in return for their labor.

4.2 Identification Strategy

To identify the impact of judicial speed on individuals' occupational choices, I follow the empirical strategy proposed by Chemin (2012), exploiting cross-state variation in exposure to the 2002 Civil Procedure Code (CPC) Amendment Act in India. The CPC, originally enacted in 1908, is the main procedural law governing civil litigation and thus the resolution of most credit contract disputes. The 2002 amendment introduced a series of procedural reforms intended to accelerate civil case processing, including tighter time limits at various stages of proceedings, restrictions on adjournments, and expanded use of alternative dispute resolution mechanisms.

Although the Act applied nationally, its net effect on court procedures differed across states because individual states had previously amended specific CPC orders and rules at different points in time. Some states had already adopted provisions similar to those in the 2002 reform, while others had not. As a result, states received different "policy doses" when the national amendment was

implemented. Following Chemin (2012), I summarize this heterogeneity in a state-level treatment-intensity index that captures how much each state was newly exposed to the reform.

Intuitively, states that had not pre-adopted many of the speed-enhancing provisions experienced a larger improvement in judicial efficiency when the 2002 Act came into force, while states that had already implemented similar amendments experienced a smaller change. The empirical identification relies on a difference-in-differences design in which this state-level treatment intensity is interacted with post-reform indicators. The resulting DiD coefficients trace how improvements in judicial speed, interpreted as stronger credit contract enforcement, affect the probabilities of being a voluntary entrepreneur, an involuntary entrepreneur, or a worker. Full details on the construction of the treatment-intensity index and the underlying amendment coding are provided in Appendix D.

4.3 Data and Variable Construction

The empirical analysis uses individual-level data from three rounds of the Employment and Unemployment Surveys of the National Sample Survey (NSS): the 50th (1993–94), 55th (1999–2000), and 61st (2004–2005) rounds. These nationally representative surveys provide detailed information on individual's employment status, demographic characteristics, and enterprise activity. The data consist of repeated cross-sections rather than a panel. The 55th and 61st rounds serve as the pre- and post-reform periods surrounding the 2002 Civil Procedure Code Amendment Act. The 50th round is used to assess pre-reform trends. The sample is restricted to working-age individuals engaged in non-agricultural activities. Individuals classified as unpaid family workers, unemployed, or not in the labor force are excluded.

Occupational outcomes are constructed using the NSS activity-status classifications. Individuals whose principal activity status is *employer*—defined as those who run their own enterprise (alone or with partners) and primarily operate it by hiring labor—are classified as *voluntary entrepreneurs*. Those classified as *own-account workers*, who operate their own enterprises but typically do so without hiring labor, are classified as *involuntary entrepreneurs*. Economically, this classification maps naturally into the model's distinction between opportunity-driven and necessity-driven entrepreneurship: employers are more likely to have entered entrepreneurship to exploit business opportunities and operate at a larger scale with hired labor, whereas own-account workers typically engage in self-employment due to limited wage-employment options, with low capital intensity and minimal labor hiring, making their activities closer to subsistence employment. *Workers* are defined as individuals employed in the enterprises of others and receiving a fixed wage or salary; both regular and casual wage earners are grouped into this category.

The dependent variable is a categorical indicator taking three values corresponding to voluntary entrepreneurs, involuntary entrepreneurs, and workers. Individual-level controls include education, age, gender, marital status, religion, and social group. Education is constructed as an ordinal categorical variable ranging from 1 to 6, with higher values corresponding to higher levels of educational attainment and a greater number of years of schooling. [12] In addition to state fixed effects, the empirical specifications include time-varying state-level controls to account for concurrent institutional and economic changes, drawn from the RBI Handbook of Statistics on Indian States. To account for alternative channels of dispute resolution that may affect court congestion and case disposal independently of the CPC reform, I also include measures of the intensity of cases resolved through Lok Adalats (people's courts), obtained from data.gov.in.

4.4 Occupational Choice Regressions

I estimate a difference-in-differences specification that exploits cross-state variation in exposure to the 2002 CPC Amendment Act and time variation across NSS survey rounds. Identification comes from interacting a state-specific treatment-intensity index with post-reform indicators, allowing the effect of improved judicial speed to vary across states. This strategy is implemented using multinomial logit regressions of the following form:

$$\begin{aligned}\ln\left(\frac{p_{Jist}}{p_{Wist}}\right) = \alpha_{J0} + \alpha_{Js} + \lambda_J^{1994}\,1994_t + \lambda_J^{2005}\,2005_t \\ + \beta_J^{1994}\,(1994_t \times 2002AmendmentAct_s) + \beta_J^{2005}\,(2005_t \times 2002AmendmentAct_s) \\ + \gamma_J\,edu_{ist} + \mathbf{x}_{ist}\delta_J + \mathbf{d}_{st}\eta_J + \varepsilon_{ist}.\end{aligned} \tag{17}$$

The multinomial logit framework is appropriate because individuals are classified into a single principal occupation in the NSS, making voluntary entrepreneurship, involuntary entrepreneurship, and wage work mutually exclusive outcomes. This framework allows enforcement-induced shifts to be estimated jointly across the three occupational choices.

In equation (16), the subscript J denotes either voluntary or involuntary entrepreneurship, while W denotes wage work; i indexes individuals, s states, and t time. Wage work is the omitted base category, so coefficients are interpreted relative to employment as a worker. The term p_{Jist} denotes the probability that individual i in state s at time t chooses occupation J, and p_{Wist} the probability of choosing wage work. The dependent variable, $\ln(p_{Jist}/p_{Wist})$, therefore represents

[12] Education is coded as a categorical variable from 1 to 6 (1 = not literate; 2 = below primary school; 3 = primary and middle school; 4 = secondary education; 5 = higher secondary education; 6 = graduate and above)

the log odds of choosing voluntary (or involuntary) entrepreneurship rather than wage employment.

The term α_{J0} is an intercept, while α_{Js} captures unobserved, time-invariant state-level heterogeneity (state fixed effects). The base year is 2000. The indicator variables 1994_t and 2005_t equal one in the corresponding NSS survey rounds and zero otherwise, and capture common time shocks relative to the base year. The variable $2002AmendmentAct_s$ is the state-level treatment-intensity index associated with the 2002 CPC Amendment Act, constructed as described in Section 4.2. The coefficient β_J^{2005} on the interaction $2005_t \times 2002AmendmentAct_s$ identifies the causal effect of a one-unit increase in policy dose on the log odds of choosing voluntary entrepreneurship (or involuntary entrepreneurship) relative to wage work. The interaction $1994_t \times 2002AmendmentAct_s$ serves as a placebo test for pre-trends; a statistically insignificant coefficient supports the parallel-trends assumption underlying the difference-in-differences design.

The regressions include the education measure edu_{ist} and a vector of individual-level controls $\mathbf{x}_{ist}$, as defined in Section 4.3, along with indicators for sector of employment. Time-varying state-level controls $\mathbf{d}_{st}$ are included to absorb concurrent state-level changes that may affect occupational choice. To account for variation in alternative dispute resolution outside the formal court system, $\mathbf{d}_{st}$ includes the per capita number of cases disposed by Lok Adalats at the state level. It also includes the growth rate of state-level net domestic product per capita. Standard errors are clustered at the state level to allow for serial correlation in treatment exposure within states over time.

4.5 Results

4.5.1 Summary Statistics

Table 4 reports summary statistics for the main outcome and explanatory variables in the pre-reform (2000) and post-reform (2005) periods, separately for low- and high-dose states. Low-dose states are those with treatment-intensity scores between 34 and 37 under the 2002 CPC Amendment Act, while high-dose states have scores between 38 and 40.

Across both periods and state groups, voluntary entrepreneurs constitute a small share of the non-agricultural workforce (around 2 percent), while involuntary entrepreneurs account for a substantially larger fraction (roughly 30–40 percent). Wage workers comprise the majority of the workforce, representing approximately 55–70 percent of individuals.[13] Educational attainment is low on average, with most individuals having completed no more than primary or middle school. Female labor force participation is limited, with women accounting for less than 20 percent of the working population in the sample. These patterns are consistent across low- and high-dose states

[13] Wage workers are roughly evenly split between regular and casual employment.

in both the pre- and post-reform periods.

Table 4: Summary Statistics

Year	2000		2005	
	High Dose (38–40)	Low Dose (34–37)	High Dose (38–40)	Low Dose (34–37)
Voluntary Firm Owner	0.0139	0.0096	0.0173	0.0151
	(0.117)	(0.098)	(0.130)	(0.122)
Involuntary Firm Owner	0.317	0.383	0.349	0.409
	(0.465)	(0.486)	(0.477)	(0.492)
Workers	0.669	0.607	0.633	0.576
	(0.471)	(0.488)	(0.482)	(0.494)
Education	3.377	3.329	3.388	3.337
	(1.580)	(1.698)	(1.617)	(1.693)
Sex	0.819	0.882	0.806	0.870
	(0.385)	(0.323)	(0.396)	(0.336)

Note: Standard deviations are reported in parentheses.
States are grouped into low- and high-dose categories for descriptive purposes. The regression analysis exploits cross-state variation in a continuous treatment-intensity index associated with the 2002 CPC Amendment Act.

4.6 Regression Results

Table 5 reports the marginal effects estimated from multinomial logit regressions of occupational choice on the interaction between the 2002 Amendment Act's state-level impact measure and the post-reform (2005) and pre-reform (1994) periods. Columns (1)–(2) present results for voluntary entrepreneurs (employers), columns (3)–(4) for involuntary entrepreneurs (own-account workers), and columns (5)–(6) for workers. Odd-numbered columns exclude state-level controls, while even-numbered columns include them. All specifications control for individual characteristics (education, age, sex, marital status, religion, and social group), sector controls, state fixed effects, and a common time effect.

The coefficient on the interaction term $2005_t \times 2002AmendmentAct_s$ captures the effect of improvements in judicial enforcement on occupational choice. The estimated marginal effects indicate that states experiencing larger improvements in judicial efficiency exhibit a statistically significant decline in voluntary entrepreneurship and a corresponding increase in involuntary entrepreneurship. Quantitatively, a one-unit increase in the policy dose is associated with a 0.27–0.33 percentage point reduction in the probability of being a voluntary entrepreneur and an increase of approximately 0.23 percentage points in the probability of being an involuntary entrepreneur. The marginal effect for wage work is positive but relatively small and statistically insignificant. Although these marginal effects are modest in magnitude, they imply economically meaningful reallocations when aggregated over India's large working-age population. The pre-reform interaction

Table 5: Marginal Effects of Judicial Speed on Occupational Choice (Multinomial Logit)

	Voluntary Entrepreneur (Employer)		Involuntary Entrepreneur (Own-Account)		Worker	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Post-Reform						
(2005 · 2002AmendmentAct)	-0.0027***	-0.0030***	0.0023	0.0023	0.0004	0.0006
	(0.0009)	(0.0011)	(0.0054)	(0.0054)	(0.0056)	(0.0057)
Panel B: Pre-Reform (Placebo)						
(1994 · 2002AmendmentAct)	-0.0027	-0.0030	0.0041	0.0040	-0.0014	-0.0010
	(0.0019)	(0.0022)	(0.0047)	(0.0050)	(0.0052)	(0.0059)
Edu	0.0051***	0.0051***	-0.0401***	-0.0401***	0.0350***	0.0350***
	(0.0002)	(0.0002)	(0.0025)	(0.0025)	(0.0025)	(0.0025)
Time, State FE	Yes	Yes	Yes	Yes	Yes	Yes
Indiv. Controls	Yes	Yes	Yes	Yes	Yes	Yes
State-level Controls	No	Yes	No	Yes	No	Yes
Sector Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	286,165	286,165	286,165	286,165	286,165	286,165
Pseudo R^2	0.0804	0.0809	0.0804	0.0809	0.0804	0.0809

Notes: Reported coefficients are average marginal effects on the probability of choosing each occupation. Standard errors in parentheses. Significance: $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. Standard errors are clustered at the state level.

$1994_t \times 2002AmendmentAct_s$ is statistically insignificant across all occupational categories, providing no evidence of differential pre-trends and supporting the validity of the difference-in-differences design. Education has a strong and statistically significant association with occupational choice: higher educational attainment increases the likelihood of voluntary entrepreneurship and reduces the likelihood of involuntary entrepreneurship. This pattern is consistent with education proxying for individual skill or ability that facilitates operation at larger firm scale

Overall, the empirical results are consistent with the model's predictions. In the model, improvements in judicial enforcement raise equilibrium wages and borrowing costs, making marginal voluntary entrepreneurship less profitable while enabling the most productive firms to expand. The observed shift away from voluntary entrepreneurship toward own-account self-employment and wage work is therefore consistent with the transitional reallocation dynamics implied by improved credit enforcement.

5 Conclusion

This paper develops and quantifies a general-equilibrium framework to evaluate the role of credit contract enforcement in shaping income disparities across Indian states. The model features hetero-

geneous agents who sort into voluntary entrepreneurship, involuntary (necessity) entrepreneurship, or wage work, subject to credit enforcement and labor-market frictions. State-specific enforcement capacity governs borrowing constraints, shaping firm scale and the allocation of capital and labor across production units.

Quantitatively, the calibrated model reproduces key cross-state patterns in GDP per capita and firm size distributions. Differences in credit contract enforcement explain approximately 6 percent of the variation in per-capita income across Indian states in 2017–18. Stronger enforcement relaxes borrowing constraints for productive but asset-poor entrepreneurs, reallocating resources toward larger and more efficient firms, raising equilibrium wages and interest rates, and increasing aggregate output.

The common-capital-market extension shows that financial integration can amplify regional disparities. Capital mobility directs investment toward high-enforcement states, where firms operate at larger scales and achieve higher productivity, while low-enforcement states experience reduced entrepreneurial activity and constrained capital accumulation. These spillovers underscore the importance of improving enforcement institutions to prevent divergence in integrated economies.

The empirical analysis corroborates the model's mechanisms using individual-level data from three rounds of the National Sample Survey Employment and Unemployment Surveys (1993–94, 1999–2000, and 2004–05), exploiting cross-state variation in the implementation intensity of the 2002 Civil Procedure Code Amendment Act. Multinomial logit estimates indicate that improvements in judicial efficiency reduce the likelihood of voluntary entrepreneurship and increase the likelihood of involuntary entrepreneurship and wage work, though the latter effects are statistically insignificant. These patterns align with the model's prediction that stronger enforcement raises entry thresholds for voluntary entrepreneurship while improving the average quality of operating firms.

Overall, the findings demonstrate that institutional quality in credit markets—specifically, effective contract enforcement—has measurable implications for occupational allocation, resource efficiency, and income disparities. Judicial reforms that accelerate dispute resolution can enhance entrepreneurial productivity and narrow regional income gaps. Future work could extend the framework to incorporate dynamic reforms, informal enforcement mechanisms, and interactions with labor and land market frictions.

References

Antunes, A., Cavalcanti, T., and Villamil, A. P. (2008). The effect of financial repression and enforcement on entrepreneurship and economic development. *Journal of Monetary Economics*, 55(2):278–297.

Banerjee, A. V. and Moll, B. (2010). Why does misallocation persist? *American Economic Journal: Macroeconomics*, 2(1):189–206.

Buera, F. J., Kaboski, J. P., and Shin, Y. (2011). Finance and development: A tale of two sectors. *American economic review*, 101(5):1964–2002.

Buera, F. J., Kaboski, J. P., and Shin, Y. (2020). The macroeconomics of microfinance.

Buera, F. J., Kaboski, J. P., and Shin, Y. (2021). Firms and the financing of development. *Annual Review of Economics*, 13:497–520.

Buera, F. J. and Shin, Y. (2013). Financial frictions and the persistence of history: A quantitative exploration. *American Economic Journal: Macroeconomics*, 5(4):217–249.

Chemin, M. (2012). Does the quality of the judiciary shape economic activity? evidence from a judicial reform in india. *Journal of Law, Economics, and Organization*, 28(3):460–485.

Dabla-Norris, E., Ji, Y., Townsend, R. M., and Unsal, D. F. (2017). Distinguishing constraints on financial inclusion and their impact on gdp and inequality.

De Mel, S., McKenzie, D., and Woodruff, C. (2010). Who are the microenterprise owners? evidence from sri lanka on tokman versus de soto. In *International differences in entrepreneurship*, pages 63–87. University of Chicago Press.

Gropp, R., Scholz, J. K., and White, M. J. (1997). Personal bankruptcy and credit supply and demand. *The Quarterly Journal of Economics*, 112(1):217–251.

Karaivanov, A. and Yindok, T. (2015). Involuntary entrepreneurship: Evidence from thai urban data. Technical report, SFU Working Paper.

King, R. G. and Levine, R. (1993). Finance and growth: Schumpeter might be right. *The quarterly journal of economics*, 108(3):717–737.

Knight, F. H. (1921). Risk, uncertainty and profit new york. *NY: Harper & Row*.

La Porta, R., Lopez-de Silanes, F., Shleifer, A., and Vishny, R. W. (1997). Legal determinants of external finance. *The journal of finance*, 52(3):1131–1150.

Levine, R. and Rubinstein, Y. (2017). Smart and illicit: who becomes an entrepreneur and do they earn more? *The Quarterly Journal of Economics*, 132(2):963–1018.

Levine, R. and Rubinstein, Y. (2018). Selection into entrepreneurship and self-employment. *Quarterly Journal of Economics*, 133(2):763–805.

Lewis, W. A. (2013). *Theory of economic growth*. Routledge.

Lilienfeld-Toal, U. v., Mookherjee, D., and Visaria, S. (2012a). The distributive impact of reforms in credit enforcement: Evidence from indian debt recovery tribunals. *Econometrica*, 80(2):497–558.

Lilienfeld-Toal, U. v., Mookherjee, D., and Visaria, S. (2012b). Judicial efficiency and firm performance: Evidence from india. *Quarterly Journal of Economics*, 127(3):1395–1442.

Mora-Sanguinetti, J. S., Martínez-Matute, M., and García-Posada, M. (2017). Credit, crisis and contract enforcement: evidence from the spanish loan market. *European Journal of Law and Economics*, 44(2):361–383.

Murphy, K. M., Shleifer, A., and Vishny, R. W. (1991). The allocation of talent: Implications for growth. *The quarterly journal of economics*, 106(2):503–530.

Ponticelli, J. and Alencar, L. S. (2014). Court enforcement, bank loans, and firm investment: Evidence from a bankruptcy reform in brazil. *The Quarterly Journal of Economics.*, 129(3):1377—1413.

Porta, R. L., Lopez-de Silanes, F., Shleifer, A., and Vishny, R. W. (1998). Law and finance. *Journal of political economy*, 106(6):1113–1155.

Rajan, R. G. and Ramcharan, R. (2020). Judicial efficiency and credit market outcomes: Evidence from indian states. *Journal of Law and Economics*, 63(4):663–703.

Schumpeter, J. A. (1911). *Theorie der wirtschaftlichen Entwicklung*. Duncker & Humblot, Leipzig. Revised and reprinted in English as Schumpeter, J. A. (1934). *The Theory of Economic Development*.

Tokman, V. (2007). Modernizing the informal sector (un/desa working paper no. 42). *Economic &Social Affairs. New York: United Nations*, pages 1–12.

Appendix

A Policy Functions

A.1 Policy Functions under Partial Equilibrium

This subsection provides a detailed description of all the policy functions under partial equilibrium, holding wages w and interest rates r fixed. Individuals differ in asset holdings a, entrepreneurial productivity z, and labor-market access $\ell \in \{0, 1\}$, and choose capital demand $k(a, z, \ell)$, labor demand $l(a, z, \ell)$, occupational choice $o(a, z, \ell)$, and next-period assets $a'(a, z, \ell)$.

Capital and Labor Demand. Capital and labor inputs are determined by solving the static profit-maximization problem subject to the enforcement-induced borrowing constraint $k \leq \bar{k}(a, z, \phi)$. For every state (a, z, ℓ), individuals compute the constrained optimal input choices (k^o, l^o), regardless of whether they ultimately choose to operate a firm or work as a wage laborer. When the borrowing constraint does not bind, entrepreneurs rent the unconstrained profit-maximizing quantities (k^u, l^u), which depend only on prices and productivity. When the constraint binds, capital demand equals the collateral-based borrowing limit, which is increasing in asset holding a and enforcement quality ϕ. Labor demand adjusts optimally given capital and therefore also increases with a and ϕ for constrained individuals.

Occupational choice is determined by comparing the profits from operating a firm to the wage w, conditional on labor-market access. As a result, capital and labor demand are realized in equilibrium only for those individuals who choose or are forced to operate a firm, while the policy functions for capital and labor are defined for all states (a, z, ℓ).

Occupational Choice. Figure A1 depicts occupational choice policy functions in (a, z) space under partial equilibrium for two values of ϕ, separately for $\ell = 1$ and $\ell = 0$. Panels (i) and (ii) correspond to perfect enforcement ($\phi = 1$), while panels (iii) and (iv) correspond to imperfect enforcement ($\phi = 0.25$).

When $\ell = 1$, individuals choose between wage work and firm operation, becoming voluntary entrepreneurs if firm profits exceed the wage w. When $\ell = 0$, wage employment is unavailable and individuals must operate a firm; they are classified as voluntary entrepreneurs if profits exceed w and as involuntary entrepreneurs otherwise. For a given value of ϕ, the cutoff in (a, z) space separating voluntary entrepreneurship from wage work when $\ell = 1$ coincides with the cutoff separating voluntary from involuntary entrepreneurship when $\ell = 0$, since involuntary entrepreneurs

are precisely those individuals who would choose wage employment if labor-market access were available.

Under perfect enforcement ($\phi = 1$), borrowing constraints do not bind and firm profits depend only on productivity z, generating a productivity-based cutoff for voluntary entrepreneurship.

Under imperfect enforcement, borrowing constraints bind, making profits depend jointly on a and z. As asset holdings decline, entrepreneurs must have higher productivity z to offset the tighter borrowing constraint. A lower enforcement parameter thus raises the productivity threshold required for low-asset individuals to operate a voluntary firm and expanding the regions of wage work and involuntary entrepreneurship.

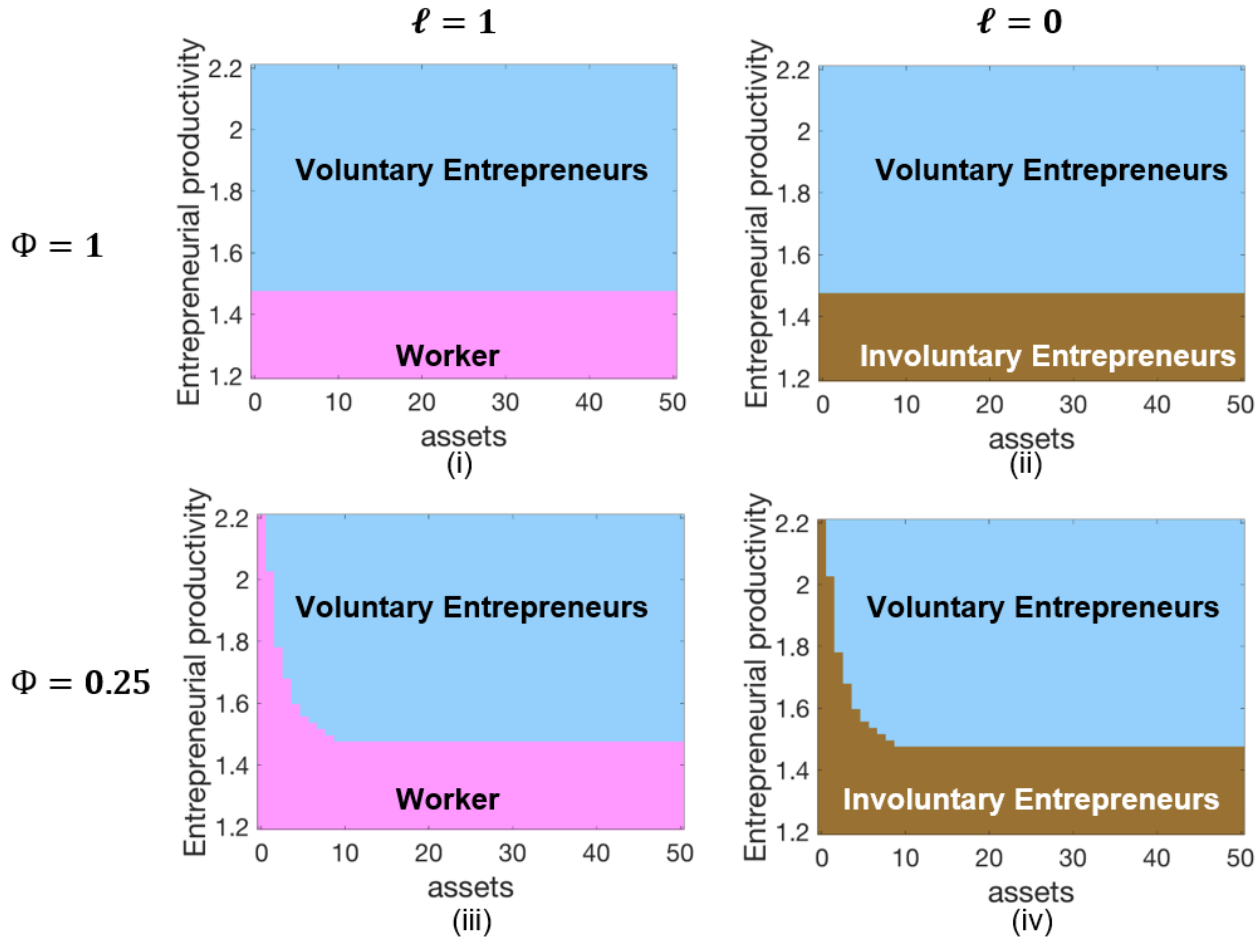


Figure A1: Occupational Choice Policy Functions under Partial Equilibrium

Asset Choice. The asset choice policy function $a'(a, z, \ell)$ reflects the interaction of income effects and collateral-accumulation incentives. Holding wages w and interest rates r fixed, higher enforcement relaxes borrowing constraints, allowing firm owners to rent more capital and hire more

labor. This expansion in firm scale raises profits and income of firm owners, generating a standard income effect that increases saving and a'.

When enforcement is weak, productive but asset-poor individuals face tight borrowing constraints and therefore have strong incentives to accumulate assets in order to relax future constraints and expand firm scale. As a result, the self-financing motive induces higher values of $a'(a, z, \ell)$ when ϕ is low. Which force dominates when ϕ increases depends on an individual's asset position, productivity draw, and proximity to the collateral constraint.

A.2 Occupational Choice Policy Functions under General Equilibrium

This subsection explains occupational choice policy functions under general equilibrium, where wages w and interest rates r adjust endogenously in response to changes in credit contract enforcement ϕ.

Figure A2 plots occupational choice regions in (a, z) space under general equilibrium for two values of ϕ, separately for $\ell = 1$ and $\ell = 0$. Panels (i) and (ii) correspond to perfect enforcement ($\phi = 1$), while panels (iii) and (iv) correspond to imperfect enforcement ($\phi = 0.25$). The figure highlights how endogenous price adjustments reshape occupational choice regions under general equilibrium. Relative to imperfect enforcement, higher enforcement shifts the boundary between wage employment (involuntary entrepreneurship) and voluntary entrepreneurship upward in productivity space, reflecting the increase in the equilibrium wage.

In general equilibrium, higher enforcement relaxes borrowing constraints but also raises equilibrium wages and interest rates, increasing input costs. For high-productivity individuals with low asset holdings, the relaxation of borrowing constraints dominates the rise in input costs, expanding the set of voluntary entrepreneurs at low asset levels. In contrast, for low-productivity individuals, higher input costs can outweigh the benefits of looser borrowing constraints, causing some individuals who would otherwise operate firms voluntarily to reallocate into involuntary entrepreneurship or wage employment.

These shifts in occupational choice regions generate the compositional patterns illustrated in the figure. As enforcement improves, voluntary entrepreneurs become fewer but larger and more productive, while marginal firms exit into wage employment or involuntary entrepreneurship. The resulting reallocation of mass toward high-productivity entrepreneurs underlies the aggregate productivity gains associated with stronger credit contract enforcement.

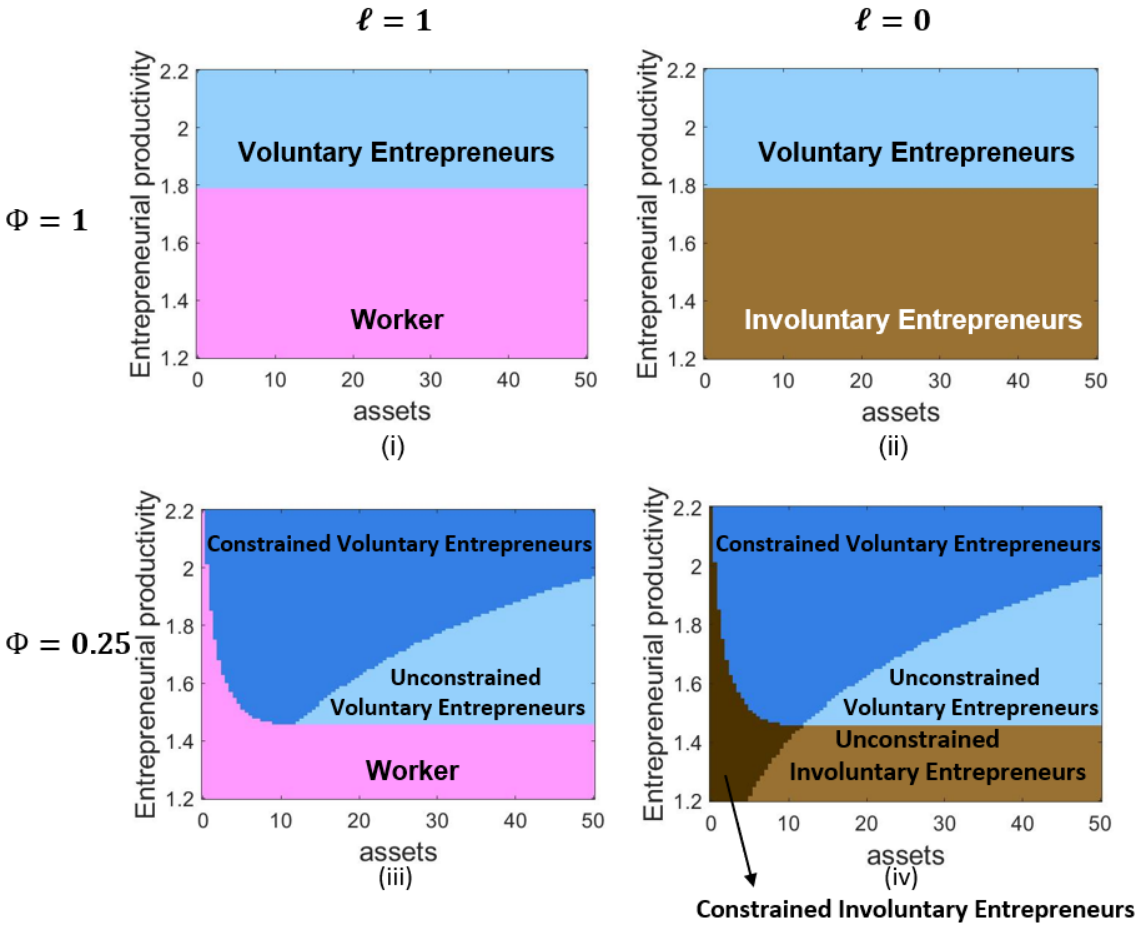


Figure A2: Occupational Choice Policy Functions under General Equilibrium

B Tables from model extension with common capital market

Table B1: Impact of degree of Credit Contract Enforcement in State 1 (ϕ_1) on State 1 Outcomes: Two-State Model with a Common Capital Market ($\phi_2 = 0$)

	ϕ_1					
	0	0.2	0.4	0.6	0.8	1.0
Interest Rate (r)	0.00	0.00	0.00	0.00	0.04	0.05
Wage (w)	1.83	2.16	2.50	3.16	3.83	4.16
Output per Capita (Y)	3.29	4.14	5.19	6.22	7.67	7.94
Voluntary entrepreneurs	3.24	4.07	5.06	5.98	7.50	7.92
Involuntary entrepreneurs	0.05	0.07	0.13	0.24	0.17	0.15
Capital per Capita (K)	2.64	3.69	5.63	9.40	17.52	20.21
Worker Share (L)	0.54	0.55	0.57	0.60	0.60	0.60
Share of Voluntary Entrepreneurs	0.13	0.11	0.08	0.04	0.04	0.04
Share of Involuntary Entrepreneurs	0.33	0.34	0.35	0.36	0.36	0.36
Mean Talent (Voluntary Entrepreneurs)	5.37	5.79	6.91	12.03	12.03	12.03

Notes: The table reports State 1 outcomes as credit contract enforcement in State 1 (ϕ_1) varies, holding State 2 enforcement fixed at $\phi_2 = 0$, in a two-state economy with a common capital market.

Table B2: Impact of degree of Credit Contract Enforcement in State 1 (ϕ_1) on State 1 Outcomes: Two-State Model with a Common Capital Market ($\phi_2 = 1$)

	ϕ_1					
	0	0.2	0.4	0.6	0.8	1.0
Interest Rate (r)	0.05	0.05	0.06	0.06	0.07	0.07
Wage (w)	1.99	2.25	2.52	3.17	3.70	3.96
Output per Capita (Y)	3.19	3.75	4.83	5.79	7.17	7.34
Voluntary entrepreneurs	3.13	3.54	4.62	5.62	7.02	7.20
Involuntary entrepreneurs	0.06	0.20	0.21	0.17	0.15	0.14
Capital per Capita (K)	2.19	2.52	4.32	7.85	13.85	15.82
Worker Share (L)	0.55	0.60	0.60	0.60	0.60	0.60
Share of Voluntary Entrepreneurs	0.11	0.04	0.04	0.04	0.04	0.04
Share of Involuntary Entrepreneurs	0.34	0.36	0.36	0.36	0.36	0.36
Mean Talent (Voluntary Entrepreneurs)	5.66	12.03	12.03	12.03	12.03	12.03

Notes: The table reports State 1 outcomes as credit contract enforcement in State 1 (ϕ_1) varies, holding State 2 enforcement fixed at $\phi_2 = 1$, in a two-state economy with a common capital market.

C Tables and Figures from Quantitative Analysis

Table C1: Mapping State-Level Judicial Speed to Enforcement Parameter (ϕ_S) (Approach 1)

State	**Avg. Age of Disposed Cases (years)**	ϕ_S
Andhra Pradesh	2.81	0.38
Assam	2.48	0.42
Bihar	5.90	0.10
Chhattisgarh	4.80	0.17
Goa	4.25	0.22
Gujarat	5.31	0.13
Haryana	1.89	0.50
Himachal Pradesh	2.65	0.40
Jharkhand	5.00	0.15
Karnataka	3.14	0.34
Kerala	2.16	0.46
Madhya Pradesh	2.80	0.38
Maharashtra	3.91	0.25
Odisha	4.27	0.21
Punjab	2.26	0.45
Rajasthan	4.36	0.21
Tamil Nadu	3.04	0.35
Telangana	3.56	0.29
Uttar Pradesh	4.83	0.17
Uttarakhand	2.85	0.37
West Bengal	5.26	0.14

Notes: Judicial speed is measured as the average age of disposed civil cases (in years). Source: National Judicial Data Grid (NJDG).

Table C2: Calibrated ϕ_S (Approach 2)

State	**Data Moment** (Ext. Fin./GDP)	**Model Moment** (Ext. Fin./GDP)	ϕ_S
Andhra Pradesh	0.42	0.42	0.30
Assam	0.21	0.21	0.16
Bihar	0.25	0.25	0.19
Chhattisgarh	0.31	0.31	0.23
Goa	0.25	0.25	0.19
Gujarat	0.37	0.37	0.27
Haryana	0.34	0.34	0.25
Himachal Pradesh	0.20	0.20	0.15
Jharkhand	0.21	0.21	0.16
Karnataka	0.45	0.45	0.31
Kerala	0.43	0.43	0.30
Madhya Pradesh	0.32	0.32	0.24
Maharashtra	1.03	1.03	0.56
Odisha	0.25	0.25	0.19
Punjab	0.48	0.48	0.33
Rajasthan	0.33	0.33	0.24
Tamil Nadu	0.56	0.56	0.38
Telangana	0.62	0.62	0.40
Uttar Pradesh	0.30	0.30	0.22
Uttarakhand	0.21	0.21	0.16
West Bengal	0.39	0.39	0.26

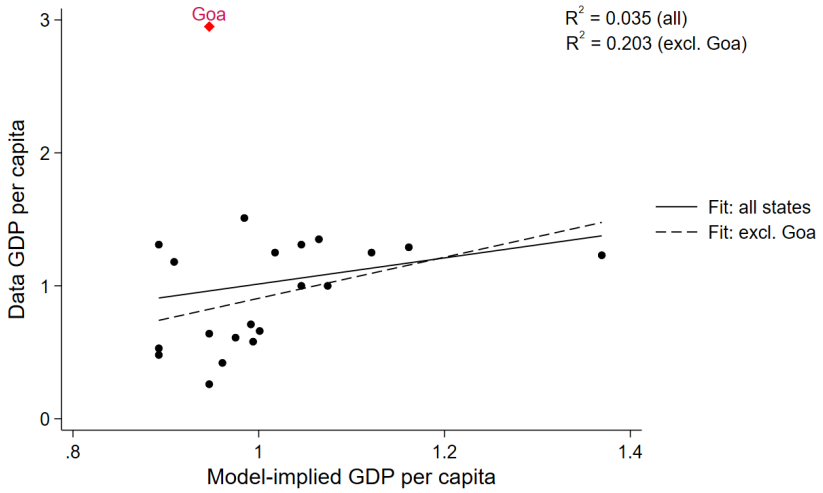
Notes: In Approach 2, ϕ_S is chosen to match each state's external finance-to-GDP in the model to its data counterpart.

Table C3: Data vs. Model-Predicted Outcomes (Approach 2)

State	$Y^*_{\textbf{Model}}$	$Y^*_{\textbf{Data}}$	**Avg. Voluntary Firm Size* (Model)**	**Avg. Voluntary Firm Size* (Data)**
Andhra Pradesh	1.05	1.00	1.11	0.96
Assam	0.89	0.53	0.87	0.64
Bihar	0.95	0.26	0.81	0.19
Chhattisgarh	0.98	0.61	1.00	0.84
Goa	0.95	2.95	0.81	0.72
Gujarat	1.02	1.25	1.09	1.23
Haryana	0.98	1.51	1.11	1.11
Himachal Pradesh	0.91	1.18	0.70	0.99
Jharkhand	0.89	0.48	0.87	1.03
Karnataka	1.06	1.35	1.12	1.70
Kerala	1.05	1.31	1.11	0.89
Madhya Pradesh	0.99	0.58	1.02	1.00
Maharashtra	1.37	1.23	2.64	0.96
Odisha	0.95	0.64	0.81	0.93
Punjab	1.07	1.00	1.18	1.20
Rajasthan	0.99	0.71	1.02	0.89
Tamil Nadu	1.12	1.25	1.21	1.63
Telangana	1.16	1.29	1.22	0.67
Uttar Pradesh	0.96	0.42	1.06	0.89
Uttarakhand	0.89	1.31	0.87	1.21
West Bengal	1.00	0.66	1.08	1.31

Notes: * Re-scaled values, with the median state value normalized to 1.

Figure C1: Predicted vs Observed Output per capita (Approach 2)



Note: Values on both axis are re-scaled, mean set to 1

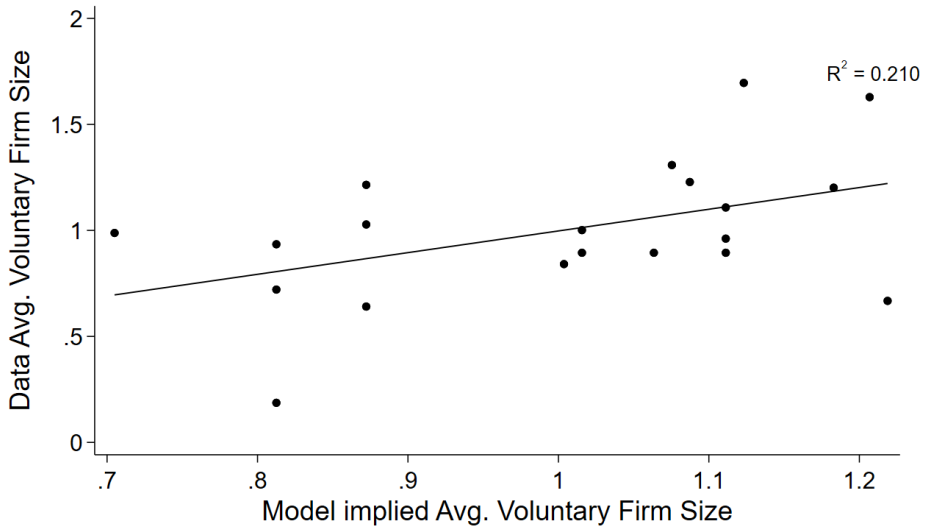
Table C4: State-Level Civil Case Disposal Time and Calibrated ϕ_S (Approach 2)

State	ϕ_S	**Avg. Age of Disposed Cases (years)**
Andhra Pradesh	0.30	2.81
Assam	0.16	2.48
Bihar	0.19	5.90
Chhattisgarh	0.23	4.80
Goa	0.19	4.25
Gujarat	0.27	5.31
Haryana	0.25	1.89
Himachal Pradesh	0.15	2.65
Jharkhand	0.16	5.00
Karnataka	0.31	3.14
Kerala	0.30	2.16
Madhya Pradesh	0.24	2.80
Maharashtra	0.56	3.91
Odisha	0.19	4.27
Punjab	0.33	2.26
Rajasthan	0.24	4.36
Tamil Nadu	0.38	2.98
Telangana	0.40	3.56
Uttar Pradesh	0.22	4.83
Uttarakhand	0.16	2.85
West Bengal	0.26	5.26

Notes: Case disposal time is measured as the average age of disposed civil cases (in years). Source: National Judicial Data Grid (NJDG). ϕ_S values are calibrated under Approach 2.

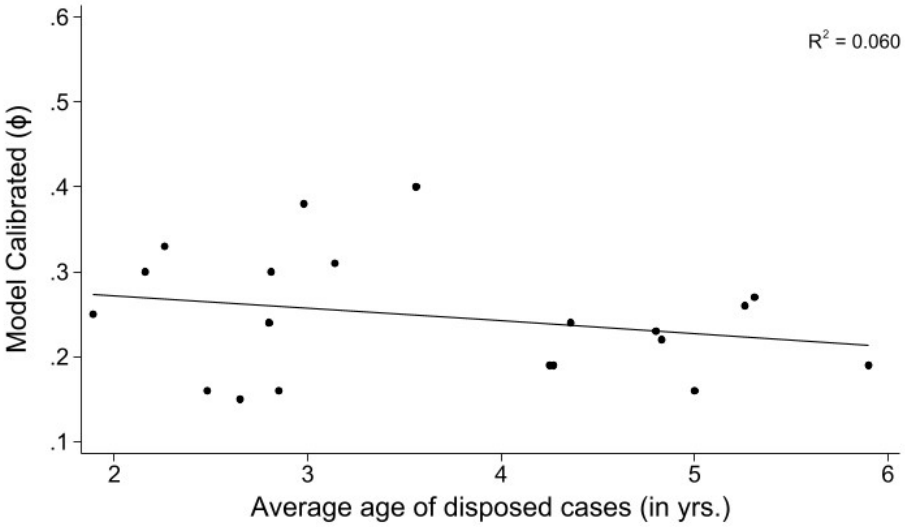
Figure C2: Predicted vs Observed Firm Size and Calibrated (ϕ_S) vs Judicial Speed (Approach 2)

(a) Predicted vs Observed Avg. Voluntary Firm Size (Approach 2)



Note: Maharashtra, identified as an outlier with a disproportionately high credit-to-GDP ratio due to the concentration of national headquarters and financial institutions, and therefore having a disproportionately high calibrated (ϕ_S), has been excluded from this scatter plot.

(b) Model-Calibrated (ϕ_S) vs. State-Level Case Disposal Time (Approach 2)



Note: Maharashtra is excluded for the same reason as in Panel (a).

D Empirical Appendix: Judicial Reform and Treatment Intensity

This appendix provides additional details on the 2002 Civil Procedure Code (CPC) Amendment Act and on the construction of the state-level treatment-intensity measure used in Section 4.2.

The 2002 CPC Amendment Act introduced 88 amendments to the CPC affecting the functioning of civil courts across all Indian states.[14] Many of these changes were designed to accelerate case processing and reduce procedural delays. Examples include: (i) prescribing time limits for serving summons on defendants; (ii) empowering courts to refer disputes to alternative dispute resolution mechanisms such as Lok Adalats, arbitration, conciliation, and mediation; (iii) imposing mandatory time limits at various stages of litigation; (iv) restricting the number of permissible adjournments; and (v) modifying the scope for appeals.

Chemin (2012) evaluates each of the 88 amendments and identifies a subset that is likely to affect court speed. Each amendment is assigned a value of $+1$ if it is expected to accelerate case disposal and -1 if it is expected to slow proceedings. Summing across all speed-relevant amendments yields the total effect of the 2002 Act for a state that had not previously modified the corresponding CPC provisions (the "baseline" state).

Indian states have the authority to amend the CPC within their jurisdiction. In practice, several states modified specific orders and rules before 2002, sometimes decades earlier. These pre-2002 amendments often overlapped with provisions later introduced at the national level by the 2002 Act. As a result, the net effect of the national reform differed across states.

To construct a state-level treatment-intensity index, Chemin (2012) starts from the aggregate speed score for the hypothetical baseline state and then adjusts it for each actual state on the basis of its pre-2002 amendments:

- If a state had already enacted the *exact same* amendment as the 2002 Act for a given order–rule pair, that amendment does not generate a marginal change in 2002, and the corresponding score is subtracted from the baseline total for that state.
- If a state had enacted a *similar but not identical* amendment, the score is adjusted to reflect only the incremental effect of the 2002 provision relative to the pre-existing state rule.
- If a state had not amended the relevant order or rule prior to 2002, it retains the full score associated with that amendment.

As an illustration from Chemin (2012), Order 20, Rule 1 of the Code of Civil Procedure specifies the timeline for pronouncing judgments after the close of hearings. The 2002 Amendment

[14] See Chemin (2012) for a full legal discussion.

Act changed this limit from 15 days (30 days in exceptional circumstances) to 30 days (60 days in exceptional circumstances). For a state that had not previously modified this rule, the amendment was coded as -1, as it lengthens the time allowed for delivering judgments and is therefore expected to slow case disposal. However, Tamil Nadu, Pondicherry, and Andhra Pradesh had already removed all time limits on judgment delivery as early as 1930. For these states, the 2002 Act effectively reintroduced binding deadlines, tightening procedures relative to their pre-reform status. Accordingly, Chemin assigns these states a net score of $+1$ for this provision (a baseline -1 offset by a $+2$ adjustment), reflecting an improvement in judicial speed.

Applying this logic across all speed-relevant provisions, Chemin computes a state-specific total impact score for the 2002 Amendment Act, which summarizes the cumulative procedural change induced by the reform in each state.[15] These scores range from 34 to 40 across states.[16] I use this total impact score as a treatment-intensity index, capturing the extent to which each state was newly exposed to the 2002 reform. This treatment index is interacted with post-reform indicators in a difference-in-differences framework to identify the causal effect of improvements in judicial speed on occupational choices.

[15]The states of Jammu and Kashmir and Nagaland are excluded, as the Code of Civil Procedure was not applicable in these states.

[16]Chemin (2012) provides a detailed illustration of how Uttar Pradesh receives a score of 34, accounting for its full history of prior amendments (see Table A1, p. 484).