DOING IT UNDER THE TABLE

by

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In developing economies, managers often choose to hide their firms’ activities in the informal sector, beyond the reach of government officials. In this dissertation, I examine the factors that drive one widespread form of participation in the informal sector: the hiding or underreporting of sales. In the first study, I present a novel empirical strategy to estimate the extent of sales underreporting using readily available firm financial data. Applying this model to a sample of Indian manufacturing firms over the period from 1999 to 2007, I examine how sales underreporting is influenced by macroeconomic conditions and by the firm’s institutional environment, including the regulatory burden and corruption. For robustness, I benchmark my estimates against the World Bank Enterprise Survey dataset for India, which includes data on managers’ self-reported hidden sales. Comparison with the survey results provides broad support for the model.

In the second essay, I explore the links between participation in the informal economy and corporate governance. In particular, I argue that unreported sales can be viewed simultaneously as expropriation of shareholders and as participation in the informal economy. Building on the corporate governance literature, I examine the relationship between informality and two corporate governance mechanisms: the concentration of ownership, and legal protection of minority investors. Using a dataset of 643 publicly listed firms in 14 countries, drawn from the World Bank Enterprise Surveys (WBES), I find that both ownership concentration and the quality of investor protection are important drivers of informality.

In the third essay, I build on the previous two chapters, using the empirical model
introduced in the first study to examine the relationship between corporate governance and unreported sales among Indian manufacturing firms. In particular, I examine how underreporting of sales is influenced by ownership concentration, cross-listing on US and European exchanges, and by business group affiliation. As in the cross-country study, I find that ownership concentration significantly influences unreported sales. I also find that cross-listed firms report a larger portion of their sales, consistent with the argument that cross-listing limits the ability of insiders to expropriate value from external investors. Finally, I find that business group affiliated firms engage in more extensive under-reporting of sales. Furthermore, ownership concentration and cross-listing have no influence on the behavior of group firms, suggesting that these governance mechanisms are insufficient to constrain the behavior of insiders of Indian business groups. JEL codes: D22, H26, O17
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Chapter 1

Unreported Sales in India’s Manufacturing Sector

1.1 Introduction

In developing economies, many firms choose to hide their activities outside of the formal sector of the economy, beyond the reach of government officials. This is true of fully informal microenterprises that hide all of their activities, but it is also true of formal firms that choose to hide only a portion of their activities. Recently, researchers have begun to examine these informal activities of formal firms, focusing particular attention on their decision to underreport sales (Dabla-Norris, Gradstein, and Inchuauste, 2008; Gatti and Honoratti, 2008). This research provides mounting evidence that unreported sales are widespread across much of the developing world.

The widespread nature of unreported sales carries important policy implications. First, unreported sales go untaxed, representing a significant drain on public finance. It should be noted that this is a real concern in developed countries as well. For instance, Joulfaian (2000) finds evidence of widespread underreporting of income among US corporations. In a random sample of US corporate tax returns chosen for
audit as part of the IRS Taxpayer Compliance Measurement Program, Joulfaian finds that, on average, firms fail to report over twenty percent of their income. This problem is likely even more vexing for developing countries, both because tax evasion appears to be more prevalent, and because developing countries often rely more heavily on business taxes as a source of government revenue (Gordon and Li, 2009).

In addition, revenue that is hidden from tax authorities must also be omitted from firms’ financially audited reports. Thus unreported sales aggravate the information asymmetries between firms and lending institutions (Dabla-Norris and Koeda, 2008; Gatti and Honoratti, 2008), and create synergies between tax evasion and expropriation by management (Desai, Dyck, and Zingales, 2007). Furthermore, when unreported sales are highly prevalent, they may aggregate to hinder financial development at the macroeconomic level. For these reasons, it is crucial that policy-makers develop a better understanding of the factors influencing firms’ decisions to underreport sales.

In this study, I develop a novel model for estimating the extent of sales underreporting using readily available firm financial data. The model relies on two important observations. First, holding total output constant, there is a direct, one-for-one relationship between output that is sold and output that is used to restock inventory. Ceteris paribus, one additional unit sold implies that one less unit is available in inventory. Second, firms have substantially different incentives to misreport output that is sold versus output used to restock inventory. For the Indian manufacturing firms in this study, a unit reported as sold is subject to both a central excise tax and state sales tax, with rates ranging between 4 and 15 percent of the maximum retail price. Any net income derived from that sale is further subject to a corporate tax rate of roughly 30 to 35 percent. In contrast, a unit held in inventory is not subject to either sales tax or corporate tax, and is only subject to central excise tax if it is removed from the production facility and transferred to another unit of the
firm. Beyond just a lack of incentives to misreport inventory, there are also strong disincentives. Unlike sales, inventory is physically present, and is easily verifiable by tax authorities and financial auditors.

Based on this insight, I examine the relationship between sales and inventory stocks to estimate the number of units reported as sold for each unit that leaves inventory, holding total output constant. Specifically, I regress the first difference in reported sales, $\Delta S^*$, on the second order difference in inventory, $\Delta I$, and on the share-weighted changes in the inputs to production, which serve as a rudimentary production function. Under the assumptions that misreporting of inventory is negligible, and that the vast majority of units leaving inventory are in fact sold, the parameter estimate, $\lambda$, should provide a reasonable approximation of the ratio of reported sales to true sales.

Within the tax evasion and informal economy literatures, my model is closest in spirit to the models of Pissarides and Weber (1989) and Feldman and Slemrod (2007). Pissarides and Weber use household survey data from the UK to examine the relationship between reported income and food expenditure for two groups, employees, and the self-employed. Assuming that the relationship between income and food expenditure is unrelated to an individuals form of employment, and assuming that employees truthfully report their income, then any differences across the two groups in the relationship between reported income and food expenditures can be attributed to underreporting by the self-employed. Feldman and Slemrod (2007) adapt the Pissarides and Weber model, using charitable donations in place of food expenditure, and using confidential US tax return data instead of household surveys. Their model assumes that salary and wages are ‘visible’ and therefore accurately reported, while other sources of income are ‘invisible’ and subject to underreporting.

In my model, the production function serves a similar purpose to their charitable contributions function, and additions to inventory and sales fulfill the roles of visible
and invisible sources of income, respectively. However my model differs from these models in a number of important respects. First, my model is applicable to firms rather than individuals, allowing researchers to examine business tax evasion, a topic that has received far less attention in the empirical literature. Second, my model does not require confidential tax return data or cross-sectional survey data. Instead, it can be applied to publicly available micro-panel data, significantly improving accessibility, and allowing researchers to examine changes in firm behavior in response to changes in the firm’s environment, including macroeconomic shocks and policy interventions. Finally, the parameter of interest enters my model linearly, allowing for relatively clean method of estimating underreporting. In contrast, the parameter of interest in Feldman and Slemrod enters nonlinearly as one component of larger logged term.

I apply my model to a sample of firms in the Indian manufacturing sector. Using panel data for the period 1999 to 2004, I examine the relationship between sales under-reporting and the quality of institutions, exploiting state-level variation in the regulatory burden, corruption, and enforcement by tax authorities. In addition, I examine how sales under-reporting is influenced by macroeconomic conditions. My estimates suggest that each of these factors exhibits an economically significant influence on firms’ unreported sales. In particular, a one standard deviation increase in regulatory discretion, or the perception that government officials’ interpretations of the regulatory code is unpredictable, increases unreported sales by thirty to fifty percentage points. Across two measures of corruption, a one standard deviation increase in corruption increases unreported sales by roughly twelve to thirty percentage points. Enforcement by tax authorities has a strong deterrent effect on sales under-reporting. A one standard deviation increase in enforcement activity decreases unreported sales by seven to twenty three percentage points. Finally, I find that sales under-reporting is strongly counter-cyclical. A one percentage point increase in GDP growth is associated with a six to twelve percentage point decrease in unreported sales. To my
knowledge, this is the first micro-level evidence on the relationship between the informal economy and the business cycle.

I then benchmark my estimates against the WBES data, compiled from surveys administered to managers of Indian manufacturing firms in 2005. Fortuitously, one survey item included in the WBES questionnaire carries a similar interpretation to the parameter of interest in this study:

*Recognizing the difficulties many enterprises face in fully complying with taxes and regulations, what percentage of total sales would you estimate the typical establishment in your sector reports for tax purposes?*

The benchmark survey estimates provide broad support for the model in terms of sign and significance of parameter estimates. The magnitudes of the effects are also quite comparable when I restrict the sample to publicly listed firms. However, the magnitudes are generally more muted when I use the full survey sample, including smaller privately held firms. Taken together, the results suggest that large publicly traded firms are more sensitive to corruption, regulation and enforcement by tax authorities than are smaller, privately held companies.

This study makes a few contributions to the literature. Most importantly, the empirical model introduced in this study adds a useful new tool for researchers and tax authorities to study informality and tax evasion at the firm level. Allowing for the use of longitudinal firm financial data expands the range of micro-level questions that researchers can examine, especially questions related to changes in firm behaviour over time. Second, this study extends previous cross-country research on the institutional drivers of informality by showing that within-country variation in the quality of institutions also strongly influences the level of informal activity. One advantage of exploiting within-country variation, previously unexplored in the informal economy literature, is increased confidence that the firm-level data were collected in a
similar fashion, and are subject to similar accounting rules and definitions. Finally, this study provides the first firm-level evidence on the relationship between the informal economy and the business cycle, and the results suggest that the relationship is economically quite significant.

The rest of this paper is organized as follows. Section II discusses the prior literature. Section III presents the basic empirical framework of the paper. Section IV presents the data and measures while Section V presents the results. Section VI concludes with a discussion of the results and implications for future research.

1.2 Prior Literature: Informality and Institutions

This study is related to three overlapping yet distinct streams of research, each of which has contributed to our understanding of the firm’s decision to hide sales.

First, there is a large body of research that seeks to explain cross-country differences in the size of the informal economy at the macroeconomic level. Macroeconomic estimates suggest that the median size of the informal economy is roughly 37 percent of the size of official GDP in developing countries, but only 15 percent of GDP among OECD countries (Schneider and Enste, 2002). To explain this difference, economists have increasingly focused on developing countries’ lack of market supporting institutions. For instance, Djankov, La Porta, de Silanes, and Shleifer (2002) show that more stringent regulation of entry is associated with a larger informal economy in a sample of 85 countries. Johnson, Kaufmann, McMillan, and Woodruff (2000) and Loayza and Rigolini (2006) provide cross country evidence that more stringent regulation and a larger bureaucracy are both associated with a larger informal economy. Johnson, Kaufmann, and Zoido-Lobaton (1998) argue that, in many instances, it is not the formal rules and regulations that influence firm behavior, but how government officials implement those rules in practice. Using survey-based measures of regula-
tory discretion and estimates of the size of the informal economy for 42 countries, the authors find a robust positive correlation between perceived regulatory discretion and the size of the informal economy. Using a cross-section of 69 countries, Friedman, Johnson, Kaufmann, and Zoido-Lobaton (2000) find that informality is higher in countries with more bureaucracy, more corruption, and a weak legal environment.

Two recent macroeconomic studies of the informal economy examine the relationship between the informal economy and the business cycle. Loayza and Rigolini (2006) find that, for most countries, the informal sector is countercyclical, where informality is proxied at the country-level by the share of self-employment in the labor force. Using macroeconomic estimates for 145 countries, Schneider (2004) finds a negative correlation between official GDP growth and the size of the informal economy, and reaches the conclusion that a low rate of official GDP growth is a “driving force” in the informal economy.

In addition to the macroeconomic studies, there is a small, but rapidly growing literature which uses survey data to examine informality among formal firms. In the earliest survey study, Johnson, Kaufmann, McMillan, and Woodruff (2000) find that managers in post-Soviet countries with higher levels of corruption report that the ‘typical firm’ hides a substantially larger portion of their sales than is reported by managers in less corrupt countries. Later studies have examined the link between informal sales and access to formal credit (Dabla-Norris and Koeda, 2008; Gatti and Honoratti, 2008) and the use of informal credit (Safavian and Wimpey, 2007). In their cross-country survey study of the determinants of informality among formal firms, (Dabla-Norris, Gradstein, and Inchauste, 2008) find that corruption and the regulatory burden are both important drivers of informality.
1.3 Empirical Model

1.3.1 Basic Framework

I start with a simple approximation of marginal cost, as in Hall, Blanchard, and Hubbard (1986). Firm \( i \) in industry \( k \) and state \( j \) at time \( t \) produces and sells a single homogeneous product using labor, capital, materials and energy (\( L, K, M, \) and \( E \) respectively). Marginal cost is estimated directly using the changes in total cost associated with changes in output from one period to the next. Formally, marginal cost, \( x \), is approximated as:

\[
x \Delta Q_{ijkt} = w \Delta L_{ijkt} + r \Delta K_{ijkt} + b \Delta M_{ijkt} + h \Delta E_{ijkt}
\] (1.1)

\( w, r, b, \) and \( h \) are input prices where industry and year subscripts have been suppressed. Output is \( Q \), and \( \Delta \) is the first difference operator. All inputs and outputs are expressed in terms of physical units. Note that I have not made any assumptions of profit maximizing behavior. However, I have equated the average cost of the change in output with the marginal cost. This is equivalent to assuming constant returns to scale. Dividing both sides by output price, \( p \), and solving for changes in output we obtain:

\[
\Delta Q_{ijkt} = \mu_{ijkt} \left[ \frac{w}{p} \Delta L_{ijkt} + \frac{r}{p} \Delta K_{ijkt} + \frac{b}{p} \Delta M_{ijkt} + \frac{h}{p} \Delta E_{ijkt} \right]
\] (1.2)

where \( \mu \) is price over marginal cost, a common measure of market power. \( \mu \) is unobserved and treated as a parameter to be estimated. Levinsohn (1993) derives the same model under the assumption of profit maximization and approximately constant returns to scale.

A firm’s output is defined as sales, \( S \) plus any change in inventory stocks, \( \Delta I \). Therefore the change in output, \( \Delta Q \), can be decomposed into the change in sales,
\( \Delta S \), and the second order difference in inventory stocks, \( \Delta^2 I \).

\[
\Delta Q_{ijkt} = \Delta S_{ijkt} + \Delta^2 I_{ijkt}
\]  

(1.3)

Next I relax the assumption that firms accurately report their sales, allowing for the possibility that the manager chooses to report only a portion, \( \lambda \), of the firm’s true sales. Reported sales is defined as:

\[
S^*_{ijkt} = \lambda_{ijkt} S_{ijkt}
\]  

(1.4)

Assuming momentarily that \( \lambda \) is constant over time, then:

\[
\Delta S^*_{ijkt} = \lambda_{ijk} \Delta S_{ijkt}
\]  

(1.5)

Substituting in Eqs. (3) and (5) into (2) and solving for change in reported sales, \( \Delta S^*_{ijkt} \):

\[
\Delta S^*_{ijkt} = \lambda_{ijk}[-\Delta^2 I_{ijkt}] + \gamma_{ijkt}[\Delta X_{ijkt}]
\]  

(1.6)

where \( \Delta X_{ijkt} \) represents the weighted change in inputs, or the bracketed term on the right hand side of eq. (2) and \( \gamma_{ijkt} = \lambda_{ijk} \mu_{ijkt} \).

Eq. (6) gives the basic framework for the empirical model. Before discussing the identifying assumptions required to convert eq. (6) into an estimable model, it is worth pausing to discuss the underlying intuition. Having modeled the relationship between inputs and outputs in eq. (2), I can effectively treat changes in output as fixed when examining the relationship between sales and changes in inventory. *Ceteris paribus*, sales and changes in inventory should exhibit a one-for-one relationship: one more unit sold implies one less unit is available in inventory. A coefficient of less than
one implies that the firm is underreporting sales.

### 1.3.2 Change in Unreported Sales

If $\lambda$ is not constant over time, then the change in reported sales, $\Delta S^*$, has two components, change attributable to change in true sales, $\Delta S$, and change attributable to change in $\lambda$:

$$\Delta S^*_{ijkt} = \lambda_{ijkt}[\Delta S_{ijkt}] + \Delta \lambda_{ijkt}[S_{ijkt-1}] \tag{1.7}$$

Note that the first term on the right hand side of eq. (7) is equal to $\lambda_{ijkt}[-\Delta^2 I_{ijkt}] + \gamma_{ijkt}\Delta X_{ijkt}$, and the second term is equal to $\frac{\Delta \lambda_{ijkt}}{\lambda_{ijkt-1}} S^*_{ijkt-1}$.

I approximate $\frac{\Delta \lambda_{ijkt}}{\lambda_{ijkt-1}}$ using a series of industry-year indicator variables, $d_{kt}$, and state-year indicator variables, $a_{jt}$, which I interact with lagged sales:

$$\frac{\Delta \lambda_{ijkt}}{\lambda_{ijkt-1}} S^*_{ijkt-1} = \sum_k \sum_t K d_{kt} S^*_{ijkt-1} + \sum_j \sum_t J a_{jt} S^*_{ijkt-1} \tag{1.8}$$

This specification allows $\lambda$ to vary over time in response to common environmental shocks at the industry-year, and at the state-year level, while maintaining the linear form of the statistical model. With this approximation, the resulting model is:

$$\Delta S^*_{ijkt} = \lambda_{ijkt}[-\Delta^2 I_{ijkt}] + \gamma_{ijkt}[\Delta X_{ijkt}] + \sum_k \sum_t K d_{kt} S^*_{ijkt-1} + \sum_j \sum_t J a_{jt} S^*_{ijkt-1} \tag{1.9}$$

### 1.3.3 Technical Change

I use two alternative specifications to model productivity shocks. In the simplest version, I model productivity shocks using a series of industry-year and state-year fixed effects. Thus, by assumption, productivity shocks may diffuse slowly, if at all,
across industries and across states, but they diffuse rapidly within industries and states. $\nu_{kt}$ and $\Theta_{jt}$ may be freely correlated with changes in input consumption and changes in inventory (Hausman and Taylor, 1981). The error component, $\varepsilon_{ijkt}$, is idiosyncratic, assumed to be unrelated to the choice of inputs. This component may include phenomena such as breakage or spoilage. The resulting model is then:

$$
\Delta S^*_{ijkt} = \lambda_{ijkt}[-\Delta^2 I_{ijkt}] + \gamma_{ijkt}[\Delta X_{ijkt}]
+ \sum_k \sum_t d_{kt} S^*_{ijkt-1} + \sum_j \sum_t a_{jt} S^*_{ijkt-1} + \nu_{kt} + \Theta_{jt} + \varepsilon_{ijkt}
$$

If productivity shocks are proportional to firm size, (e.g. the multiplicative productivity shock in a standard Cobb-Douglas production function) then large firms will experience greater discrete shocks to output than small firms. This suggests that industry-year fixed effects will be insufficient to capture such productivity shocks, and that the error variance will be increasing in firm size. In this setting, efficiency can be gained by using modeling techniques to correct for heteroskedasticity. Therefore, I employ a two step weighted least squares estimator as described in Greene (2003) where the standard error is assumed to be a linear function of firm size (measured as the firm’s labor expenses). I also employ a maximum likelihood estimator in which the standard error as a linear function of firm size, and both the standard error and the model coefficients are jointly estimated.

### 1.3.4 Correlates of Unreported Sales

To examine the relationship between unreported sales, firm characteristics and environmental factors, I model the firm’s ratio of reported sales to true sales as a linear function of three covariates:

$$
\lambda_{ijkt} = \lambda_0 + \lambda_1 Regulation_j + \lambda_2 Corruption_j + \lambda_3 GDPgrowth_t
$$
Corruption, and Regulation capture cross-sectional, state-level variation in bureaucratic corruption and the regulatory burden, respectively. GDP growth represents the year-on-year growth in real GDP. The right hand side of eq. (11) is substituted into eq. (10), resulting in a model with a series of interactions:

\[
\Delta S^*_{ijkt} = \lambda_0[-\Delta^2 I_{ijkt}] + \lambda_1[-\Delta^2 I_{ijkt} \times Regulation_j] + \lambda_2[-\Delta^2 I_{ijkt} \times Corruption_j] \\
+ \lambda_3[-\Delta^2 I_{ijkt} \times GDPgrowth_t] + \gamma_0[\Delta X_{ijkt}] + \ldots \\
+ \gamma_5[\Delta X_{ijkt} \times GDPgrowth_t] + z\beta + \sum a_{jt}S^*_{ijkt-1} \\
+ \sum \sum d_{kt}S^*_{ijkt-1} + v_{kt} + \Theta_{jt} + \varepsilon_{ijkt}
\] (1.12)

Because \(\lambda\) is a component of \(\gamma\), the correlates of unreported sales must also be interacted with the weighted change in inputs. In doing so, I also allow the markup to vary with each of the hypothesized correlates of unreported sales. As further controls, \(z\beta\), I also include the main effect of each of the interacted variables.

### 1.3.5 Econometric Concerns

There are a number of causes for concern that \(\lambda\) provides a poor estimate of the ratio of reported-to-true sales. These concerns can be grouped into two broad categories. First are the concerns that, even if the estimate of \(\lambda\) is unbiased, \(\lambda\) may capture something other than the ratio of reported to true sales. I argue that these concerns are less troubling than they first appear. The second set of concerns revolves around endogeneity bias in the measurement of \(\lambda\). These concerns are potentially more problematic.

**What else might be captured by \(\lambda\)?** One can imagine a number of factors that might influence the estimated relationship between inventory and sales. For instance, could \(\lambda\) be driven by breakage or spoilage of inventory? In theory, the answer is yes. However, in the context of this study, breakage appears to be a minor concern.
Over 75 percent of managers in the industries of my sample report no breakage, and the average amount reported is 0.85 percent of firm sales (WBES, 2006), not nearly enough to significantly influence $\lambda$. Also, it is worth considering whether or not $\lambda$ is driven by differences in the valuation of sales and inventory stocks. In India, inventory stocks are valued at the lesser of cost of production or market price, while sales are valued at market price. Notice, however, that any divergence in the valuation of inventory and sales cannot explain an estimated $\lambda$ of less than one, but only a value of greater than one. For this reason, $\lambda$ can be viewed as a conservative estimate of the ratio of reported-to-true sales.

**Inventory investment behavior.** Will $\lambda$ also capture the behavioral response of inventory investment to realized sales shocks? To clarify this question, I will turn to a widely used inventory stock adjustment model dating back to Lovell (1961).

\[
\Delta I_{it} = \zeta (I^*_{it} - I_{it}) - \alpha (S_{it} - E[S_{it}]) + \epsilon_{it}
\]

(1.13)

where $I^*$ represents target inventory stocks. The first term on the right hand side represents planned inventory investment, driven by differences between actual and desired inventory stocks. The second term captures the extent to which inventories act as a buffer against unanticipated sales shocks. Following Blinder (1986); Carpenter, Fazzari, Petersen, Kashyap, and Friedman (1994), I assume that target inventories are a linear function of expected sales, and that expected sales can be modelled as an autoregressive forecast incorporating lagged values of sales. Substituting into equation (13) yields:

\[
\Delta I_{it} = \zeta [-I_{it}] + \alpha [-S_{it}] + \delta_1 S_{it-1} + \delta_2 S_{it-2} + \phi + \varsigma_{it}
\]

(1.14)

where $\phi$ combines the constant terms from the target inventories equation and the expected sales equation, and $\varsigma$ is an error term. In this model, the coefficient describ-
ing the linear relationship between sales and changes in inventory, \( \alpha \), measures the extent to which inventories act as a buffer against unanticipated sales shocks. Given this structure, the question can be restated: does \( \lambda \) capture this buffer effect, \( \alpha \)?

The answer is no. As Blinder, Lovell, and Summers (1981) notes, if total output is fixed, or chosen before actual sales are known, then \( \alpha \) will be unity. Inventory adjustments will completely buffer against unanticipated sales shocks. Controlling for changes in output essentially holds total output fixed. Therefore, \( \alpha \) will be unity even if the firm alters their production plans over the course of the year as they learn about current period sales. Controlling for total output replaces equation (13) with an accounting identity with no behavioral component:

\[
\Delta I_{it} = Q_{it} - S_{it}
\]  

(1.15)

This is a crucial point. To the extent that I successfully control for changes in output, firms’ inventory investment choices can be ignored. For example, variation in inventory investment over the business cycle, or the transition to lean manufacturing, will have no effect on estimates of \( \lambda \). There is one important caveat, however. If unobserved productivity or price shocks at the firm level are correlated with inventory stock adjustments, then \( \lambda \) may be biased. I discuss related concerns later in this section under the heading “endogeneity.”

**Misreporting of inventory.** Shouldn’t managers predict this sort of tool would be used by tax authorities, and over-report inventory to disguise their under-reporting of sales? Or could managers misreport inventory for some other reason all together? For instance, inflating inventory stocks directly reduces cost of goods sold and therefore directly inflates profits reported to financial markets.

However, there are multiple reasons to believe that this is not a serious concern. Most importantly, over-reporting additions to inventory could not be sustained over
any extended period because of a cumulative effect in misreported inventory. If the firm were to over-report additions to inventory by one million dollars each year, then the difference between reported and true inventory would grow by roughly one million dollars each year. Over time, the discrepancies between true and reported inventories would become quite difficult to hide from financial auditors and tax authorities. In contrast, if a firm under-reports sales by a similar amount each year, there is no cumulative effect and the difference between true and reported sales remains stable. In fact, this sort of rapid escalation in misreported inventory was one of the primary factors leading to the detection of fraud in the case of Crazy Eddie Electronics (Antar, accessed 2011). According to Crazy Eddie’s CFO, Sam E. Antar, management was able to under-report sales for thirteen consecutive years without detection. In contrast, inflation of inventory over a period of less than three years proved unsustainable, and was quickly discovered by authorities.

In addition, to take this concern seriously is to give my model too much credit for firm-level precision. Accurately estimating the relationship between sales and changes in inventory while controlling for changes in output requires either a very large number of observations or detailed prior knowledge of the firm’s underlying production function. Because I do not have such prior knowledge, I cannot estimate \( \lambda \) for each firm in each period. Instead, I pool across firms and over time to estimate how the average value of \( \lambda \) changes with environmental characteristics. For this reason, I could not state with any certainty that a specific firm was under-reporting sales.

**Misreporting of costs.** How important is the assumption that firms accurately report their consumption of inputs? After all, managers could reduce their corporate income tax liability just as easily by over-reporting costs. This is also less of a concern than it may appear. Over-reported costs will inflate the denominator of the price/cost markup ratio, reducing the size of the parameter on change in inputs, \( \Delta X \),
but leaving estimation of \( \lambda \) largely unaffected. In fact, if all firms over-reported input consumption by the same proportion, then all other parameter estimates would be completely unaffected. To the extent that over-reporting of costs is not uniform, but influenced by the variables of interest in this study (corruption, regulation, etc.), I control for this by interacting change in inputs with those variables.

While I would argue that each of the concerns listed above can be more or less ignored, there remains a more pressing concern: endogeneity. Specifically, there are two potential sources of endogeneity, both of which are ubiquitous in empirical production analyses (e.g. total factor productivity studies).

**Endogeneity.** The first potential source of endogeneity is data-driven. While the model is written in terms of prices and quantities of inputs and outputs, I have no such data. Instead, I rely on revenue and expenditure data, along with disaggregate price indices which generally correspond to the four-digit-industry level. The use of this data rather than firm-level prices and quantities carries important drawbacks. If unobserved, true prices are correlated with the included variables (e.g. changes in inventory and input consumption), this will result in omitted variable bias (Klette and Griliches, 1996). The direction of any potential bias caused by this problem is ambiguous, depending on the firm’s behavioural response to price shocks. For instance, imagine there is a demand shock resulting in an unobserved price increase in the firm’s output market. If firms choose to exploit the potentially transitory price shock by drawing down inventory, this would result in an upward bias in \( \lambda \). If on the other hand, firms respond to the increased profits by investing in inventory stocks, the direction of the bias would reverse. A similar analysis can be undertaken with an unobserved price decrease due to obsolescence of current output and inventory stocks.

A second potential source of endogeneity is the classic simultaneity problem first discussed by Marschak and Andrews (1944). Changes in input demand, and changes in inventory stocks are at least partially determined by managers’ decisions, and those
decisions could be driven in part by productivity shocks that are observed by management but not observed by the econometrician.

An obvious solution to endogeneity concerns would be to find suitable instruments for changes in inventory and the inputs to production. However, firm-level instruments that are correlated with changes in inventory but uncorrelated with sales are difficult to imagine. Firm-level instruments for inputs to production are similarly unavailable. Therefore, instead of attempting to solve the endogeneity problem directly, I take a different approach, gauging the extent of bias by benchmarking my results against an alternative estimation strategy that does not suffer from these endogeneity concerns.

1.3.6 Benchmark Model

The benchmark model uses the WBES survey data to estimate eq. (12) via OLS using the survey measure of the reported sales ratio (RSR) and a mean zero disturbance term. Because the dependent variable, \(\lambda\), is constrained to lie between 0 and 1, estimating this equation using OLS is not strictly correct. A fractional logit model would be preferable if the model were to be interpreted in isolation. However, fractional logit models are nonlinear, making comparison with the linear form estimates of eq. (13) quite difficult. Because I estimate the benchmark model for comparison purposes only, the ease of comparison associated with OLS more than compensates for the loss in technical rigour.

Prior to entering either the primary model or the benchmark survey model, each of the right hand side variables is “demeaned,” or taken net of the sample mean. The one exception is GDP growth, which I take net of 2005 GDP growth. This re-centering of the right hand side variables has no effect on the parameter estimates of \(\lambda_1\) through \(\lambda_5\), however it does allow for the interpretation of \(\lambda_0\) as the ratio of reported sales to true sales for an average-sized firm facing typical levels of corruption.
and regulation. The only difference in interpretation across the two models is that $\lambda_0$ gives the typical value for firms facing 2005 levels of economic growth in the primary model, whereas $\lambda_0$ gives the typical value for firms in 2005 in the benchmark model.

1.4 Data and Measures

I use two datasets. Firm-level financial data is taken from the Prowess Database, compiled by the Center for Monitoring the Indian Economy (CMIE). This database covers the majority of manufacturing sector output in India and has been used extensively in economic research (e.g. Khanna and Palepu, 2000; Bertrand et al., 2002). The second dataset, the World Bank Enterprise Surveys (WBES), are compiled from surveys administered in 2005 to managers of a stratified random sample of Indian firms in a wide range of industries, including the ten industries examined in the current study. Recent research on informality among formal firms has relied almost exclusively on the WBES data (e.g. Gatti and Honoratti, 2008).

To facilitate comparison across the two samples, I begin by restricting my analysis to the fourteen states and the ten largest (2-digit-level) manufacturing industries that are represented in both the CMIE and WBES datasets. The CMIE sample for these industries includes 37,101 firm-year observations for the period from 1999 to 2007. The WBES sample includes cross-sectional data on 1918 firms.

From the CMIE data, I exclude 1,340 observations on firms that are registered in states not included in the WBES sample. I also exclude foreign-owned and government-owned firms as well as cooperatives, as these firms are under-represented in the survey data, combining to account for less than three percent of the sample. Further excluding all observations with missing values on the variables of interest cuts the sample to 17,433 observations in the CMIE sample and and 1801 observations in the WBES sample.
I then make two more targeted exclusions. First, I exclude firms that sell goods that they did not produce. The analysis relies crucially on an estimated production relationship between inputs and outputs. If a firm’s sales and inventory stocks contain output that the firm did not produce, this will add unnecessary noise to the analysis. To address this problem, I construct a ratio of purchased finished goods to sales and exclude observations with a ratio larger than 0.1. Other cutoff values (e.g. 0.05, 0.25) left the results were largely unchanged. This modification reduces the sample to 15,038 firm-year observations.

Finally, I exclude firm-year observations with large discrepancies or unreasonable data. For instance, I exclude firms that report paying no wages, as well as firms with substantial divergence between reported change in inventory and calculated year-on-year change in inventory. The Prowess database contains data on end-of-year inventory stocks and change in end-of-year inventory stocks. Allowing for some rounding error, calculated year-on-year change in inventory stocks should be approximately equal to the value provided in the dataset, and in most cases the two values are quite close. However, I discard roughly the top and bottom 3 percent of observations with the largest positive and negative discrepancy between the two values. This restriction leaves a final sample of 14,014 observations on 2,893 firms over the period 1999 to 2007.

Input consumption measures are constructed using expenditure data. Labor expense is measured using total labor compensation. The more conventional measure of labor input, “number of employees,” is not available for the majority of firms in my sample, especially before 2001. Change in capital stock is measured as the investment in fixed assets net of sale of fixed assets. Energy expense is measured as fuel and energy expenses. Material inputs are measured as raw materials expenses net of change in inventory of raw materials.

A large portion of firms in India do not separately report the stock of finished
goods, so I measure inventory as the end-of-year stock of finished and semi-finished goods. Firms in India are required to use “first in first out” inventory accounting methods, suggesting that end of year inventory stocks should reflect current prices and costs. Reported sales are measured by adding the line items “sale of goods” plus “sale of scrap.” Scrap is included in the sales measure to account for the fact that stock of finished goods also includes stock of scrap.

Output prices are disaggregate wholesale price indices provided by the Indian Ministry of Commerce and Industry which generally correspond to the four-digit industry level. Materials prices are constructed as weighted averages of the same price indices where the weights are determined according to the 1998-99 Input-Output matrix. Energy prices are measured as the fuel and energy wholesale price index. The capital purchase price is measured as the machinery price index, and the capital rental rate is constructed using the Hall and Jorgenson (1967) method. Wages are measured as the industrial sector labor consumer price index.

Four of five correlates of unreported sales capture variation in the institutional environment across Indian states. These measures, constructed using the WBES survey data, are detailed in Table 1.1. For instance, Regulatory Burden is the percentage of local managers who report that industry-specific regulations represent a “major” or “very severe” problem for the operation and growth of [their] business.” On one extreme, no managers in Bihar or Chandigarh report that regulation is a major problem. In contrast, 21 percent of managers in Orissa report that regulation is a major problem. Regulatory Discretion is the percentage of managers who “disagree in most cases” or “fully disagree” with the statement “In general, government officials’ interpretations of regulations affecting my establishment are predictable.” Consistent with their responses for Regulatory Burden, none of the managers in Chandigarh report that officials’ interpretations of regulations is unpredictable. In contrast, fully 39 percent of managers in Kerala report that officials’ interpretations of regulations
is unpredictable.

*Corruption Burden* is constructed in the same manner as *Regulatory Burden*, as the percentage of local managers who report that corruption represents a “major” or “very severe problem for the operation and growth of [their] business.” Values range from 9 percent in Karnataka to 53 percent in Punjab. A second measure, *Corruption Prevalence*, is the portion of local managers who report that it is typical for firms in their sector to make informal payments or gifts to government officials. Responses vary dramatically across states, with over 83 percent of managers reporting that informal payments are typical in Chandigarh, whereas only 16 percent of managers report that informal payments are typical in Karnataka.

*INSERT TABLE 1.1 HERE*

To construct the alternative measure of $\lambda$ used for benchmarking purposes, I use the manager’s response to the survey item, “Recognizing the difficulties many enterprises face in fully complying with taxes and regulations, what percentage of total sales would you estimate the typical establishment in your sector reports for tax purposes?”

Many researchers have used this item as a proxy for informality (or the level of tax compliance) of the focal firm under the assumption that the manager will treat their own firm’s behavior as a baseline Kenyon (2008); Dabla-Norris, Gradstein, and Inchuauste (2008). The last column in Table 1.1 shows that the average ratio of reported-to-true sales varies quite dramatically across states, ranging from 96 percent in Andra Pradesh to 42 percent in Tamil Nadu.

As evidenced by the likelihood ratio test statistics reported at the bottom of Table 1.1, the perceived quality of institutions and managers’ sales under-reporting are largely driven by variation across states, but are not significantly affected by variation across industries. For instance, the firm-level measure underlying Regulatory Burden
is a binary indicator set to 1 if the manager reports that industry-specific regulations represent a “major” or “very severe problem for the operation and growth of [their] business.” Treating this measure as the dependent variable in a linear probability model, state fixed effects are highly significant while industry fixed effects are jointly insignificant. This trend continues for each of the institutional variables except for Regulatory Discretion, where the industry effects are jointly significant, but no individual industry indicator is significant. Industry effects are also jointly insignificant in predicting the survey measure of $\lambda$, suggesting that industry characteristics have little impact on unreported sales. GDP growth is a yearly measure of real GDP growth collected from the World Bank.

1.5 Results

1.5.1 Summary Statistics

In Tables 1.2 and 1.3, I present the correlation tables and summary statistics for the samples used in the next stage of analysis. In Table 1.2, I report the summary statistics and correlation tables for the primary dataset. The means and standard deviations reported in the first two columns include observations over the full sample period. However, the correlation table is constructed using only cross-sectional data from financial year 2004. The results are similar when other years are chosen. As expected, the weighted change in inputs and the change in sales are quite highly correlated, with a correlation coefficient of 0.73. This suggests that the weighted change in inputs does a reasonable job of controlling for changes in output.

The state-level measures of the regulatory environment and corruption are, for the most part, highly positively correlated with each other. For instance Regulatory Burden and Regulatory Discretion have a correlation coefficient of 0.54, suggesting that managers’ perceptions of the overall regulatory burden, and their perceptions of
arbitrary and uneven implementation of those regulations are highly correlated. Corruption Prevalence is also positively correlated with Regulatory Burden, consistent with the argument that high levels of regulation provide opportunities for bribe extraction by government officials De Soto (1989). One exception is Corruption Burden, which is not particularly highly correlated with Corruption Prevalence or Regulatory Burden, and it is negatively correlated with Regulatory Discretion. This suggests that Corruption Burden captures something substantially different from the other institutional measures.

*INSERT TABLES 1.2 AND 1.3 HERE*

Table 1.3 gives the correlation table and summary statistics for the survey sample. Section A includes statistics for the full sample while section B provides statistics for the subsample of publicly listed firms. Comparing firm size across samples, it is clear that the average firm in the full survey sample is much smaller than the firms in the CMIE sample. However, when I restrict the analysis to publicly listed firms, the survey sample becomes much more comparable.

As expected, the survey measure of $\lambda$ is negatively correlated with each of the corruption and regulation measures. These correlations provide suggestive evidence that firms hide more sales in corrupt, or heavily regulated environments.

The partial correlations among the state-level measures of corruption and regulation are similar to those reported in Table 1.2. However, there are few noticeable differences when I restrict the analysis to the sub-sample of publicly listed firms in Table 1.3.B. This variation across the samples is due largely to variation in the frequency with which each state is sampled. For instance, 48 percent of the observations in the publicly listed survey sample are on firms located in Andra Pradesh or West Bengal. In contrast, those states account for only 16 percent of the firm-year observations in the CMIE sample.
1.5.2 Primary Results

In Table 1.4, I present two sets of results using the CMIE financial data. In both sets of estimates, column (1) includes only GDP growth. Column (2) through (5) report results in which the state level variables are entered individually to reduce concerns of multicollinearity.

*INSERT TABLE 1.4 HERE*

In 1.4.A, I present maximum likelihood estimates of the full model described in eq (12). The top row of estimates, the coefficients on the second order difference in inventory, \( \Delta^2 I \), are interpreted as the ratio of reported sales to true sales for the typical firm, facing average levels of regulation, and corruption, as well as 2005 levels of GDP growth. The values fall in the range of roughly 0.83 to 0.79, and all of the coefficients are significantly different from 1. These estimates would suggest that the typical firm under-reports their sales by roughly 20 percent.

While the typical firm may under-report by 20 percent, this level of aggregation masks substantial heterogeneity across firms. The next five rows give the estimated interaction effect of each of the correlates with Change in Inventory. As outlined in Section III, these interactions are interpreted as the effects of the correlates on the ratio of reported sales to true sales.

Interestingly, sales under-reporting is strongly countercyclical. Across all models, a one percentage point increase in GDP growth is associated with a 6 percentage point decrease in unreported sales. To my knowledge, this is the first micro-level evidence on the relationship between the informal economy (or tax evasion) and the business cycle.

The two measures of bureaucratic corruption provide mixed results. also exhibit a strong positive influence on sales under-reporting. A one standard deviation increase in Corruption Prevalence, or the portion of managers who report that it is typical
for officials to ask for a bribe, predicts a 3 percentage point increase in unreported sales. On the other hand, Corruption Burden, or the percentage of managers who perceive corruption to be a constraint on operation of the business, is economically and statistically insignificant. Taken together, these results suggest that corruption perceptions are not a consistent predictor of unreported sales.

The two measures of the regulatory environment present a clearer picture. Regulatory Discretion, or the extent to which managers perceive regulations to be unevenly and arbitrarily enforced, exhibits the strongest influence on unreported sales. A one standard deviation increase in Regulatory Discretion increases unreported sales by roughly 12 percentage points. Regulatory Burden also has a significant and positive effect. A one standard deviation increase in Regulatory Burden increases unreported sales by 5 percentage points.

The weighted least squared results presented in Table 1.4.B are largely consistent with the maximum likelihood estimates discussed above. Once again, the baseline estimates of typical levels of under-reporting are all significantly different from 1 at the .01 percent level. These estimates suggest that the typical firm under-reports their sales by roughly 14 percentage points. Also, the effect of GDP growth is similar to the maximum likelihood results. A one percentage point increase in GDP growth decreases unreported sales by roughly 5 percentage points. Results for the corruption and regulatory measures are nearly indistinguishable from the ML estimates.

### 1.5.3 Benchmark Results

Table 1.5 presents OLS estimates using the survey measure of $\lambda$ as the dependent variable. In Table 1.5.A, I present benchmark estimates from the full WBES survey sample, including both private and publicly held companies. Reading across the top row of 1.5.A, the constant term is now interpreted as the reported sales ratio for the average sized firm facing typical levels of regulation, corruption and enforcement.
This takes on a value of 0.85 across all specifications, suggesting that the typical firm hides roughly 15 percent of their sales, quite similar to the results reported in 1.4.B. A value of 0.85 cannot be rejected at the 5 percent level in any of the maximum likelihood or weighted least squares models.

*INSERT TABLE 1.5 HERE*

The benchmark estimate of the effect of Corruption Prevalence is quite comparable to the results in Table 1.4. A one standard deviation increase in Corruption Prevalence increases unreported sales by 4 percentage points as compared to the 3 to 5 percentage point effect in the primary results. The two measures of the regulatory environment are also similar in terms of sign and significance, however the magnitude of the effects are more muted. For instance, a one standard deviation increase in Regulatory Discretion increases unreported sales by only 2 percentage points, while a one standard deviation increase in Regulatory Burden increases unreported sales by only 1 percentage point.

In contrast to the primary results, Corruption Burden is strongly significant and negative in the benchmark estimates. However the effect is muted. A one standard deviation increase in Corruption Burden is associated with only a 2 percentage point increase in unreported sales.

In all, the full sample survey results provide support for the sign and significance of the primary results, however the magnitude of the estimated effects of the regulatory environment are substantially diminished. It is unclear whether these differences in the estimated coefficients are driven by different estimation methods or by differences across the two samples. To examine this question, I re-estimate the model using only the subsample of 138 publicly listed firms in the WBES sample. The results are reported in Table 1.5.B.

When I restrict the sample to publicly listed firms, the baseline estimates of the
typical ratio of reported to true sales are slightly higher than previous estimates, however they remain comparable to the baseline estimates in Table 1.4.

While the coefficient on Corruption Prevalence remains unchanged, the effect of Corruption Burden loses significance, mirroring the primary results. A one standard deviation increase in Regulatory Discretion now predicts a 5 percentage point increase in unreported sales, more than double the effect in the full survey sample, and closer to the primary estimates.

1.6 Summary and Extensions

In this study, I introduce a novel method of estimating the portion of firms’ sales that goes unreported using readily available firm financial data. I apply this model to a sample of manufacturing firms in India, where I examine several determinants of sales under-reporting. Consistent with the survey evidence and with previous studies, bureaucratic corruption, regulatory discretion, and tax enforcement all have strong influences on unreported sales. The most novel result concerns the business cycle: firms’ propensity to hide sales is strongly countercyclical, with firms hiding a large portion of their sales during periods of low economic growth.

On balance, my estimates find strong support when benchmarked against the survey results. The typical level of under-reporting claimed by managers is very similar to my estimates, and the effect of regulation and corruption on sales under-reporting is quite similar across both datasets and empirical models.

While this study is a promising first step, it is certainly not exhaustive. There are plenty of promising avenues for future research. For instance, I do not explore many important determinants of participation in the informal economy, such as tax rates, and access to formal credit channels. Also, the primary dataset used in this study contained no privately held firms, precluding the possibility of comparing the
sales reporting behaviour of public and private firms. Privately held firms face lower disclosure requirements and less scrutiny by authorities, making it easier for these firms to hide sales. This suggests that my estimates, based only on publicly listed firms, may underestimate unreported sales for the manufacturing sector as a whole.

Another promising area for future research is to further exploit the longitudinal nature of the model to examine how firm-level informality evolves in response to important policy changes or macroeconomic shocks. For instance, it would be straightforward to examine how firms’ decisions to hide sales change in response to market liberalization, or an economic crisis.

The growing literature on corporate tax avoidance and corporate governance suggests at least two lines of future enquiry. When examining publicly traded firms, as I do in this study, it would be worthwhile to examine how decisions to hide sales are related to other behaviors associated with tax avoidance or evasion, such as the manipulation of accruals (Desai and Dharmapala, 2009). Empirically, do these behaviors appear to be complements or substitutes?

Finally, the literature on corporate governance, and the private benefits of control (Desai, Dyck, and Zingales, 2007) suggest that corporate governance institutions may play an important role in firms’ decision to hide sales revenue. Because management can more easily expropriate unreported sales revenue, minority shareholders may prefer to forgo the tax avoidance benefits of sales under-reporting. For this reason, strong corporate governance institutions may act as a deterrent, constraining management’s ability to hide sales. Furthermore, the business group governance structure, common in developing economies, may facilitate sales under-reporting as it provides an alternative governance structure facilitating and coordinating inter-firm sales transactions. I will leave these and other questions for future research.
Chapter 2

Informality and Corporate Governance: A Cross-Country Study

2.1 Introduction

Underdeveloped corporate governance institutions and a large informal economy are both endemic problems in less developed countries. They are also important concerns for policy makers. A large informal economy significantly reduces the tax base while poor corporate governance institutions aggravate capital market imperfections, hindering financial development and economic growth.

In this study, I examine the links between corporate governance and participation in the informal economy. Drawing on theoretical and empirical work in the informal economy, corporate governance, and corporate finance literatures, I argue that the agency problems at the heart of corporate governance, and the tax enforcement problems posed by the informal economy are characterized by a number of important similarities, and that these similarities create synergy between expropriation of
shareholders and participation in the informal economy. I then highlight how this relationship between informality and expropriation can magnify the deleterious effect of poor institutions. In particular, I describe how political risk and weak property rights protection can incentivize participation in the informal economy, with negative consequences for corporate governance.

Based on these arguments, I propose that at least one form of participation in the informal economy, the under-reporting of sales, can also be viewed as expropriation of investors’ cash-flow rights. In other words, unreported sales represent a corporate governance problem, and may require a corporate governance solution: better investor protection, improved monitoring, and reduced managerial discretion.

Drawing on the corporate governance literature, I examine the relationship between informality and two corporate governance mechanisms: the concentration of ownership in the hands of large shareholders, and legal protection of minority investors. Building on the work of Morck, Shleifer, and Vishny (1988); McConnell and Servaes (1990), I test for a quadratic relationship between ownership concentration and unreported sales. At very low levels of ownership concentration, no individual shareholders have a strong enough incentive to monitor management, resulting in the classical principal-agent problem described first by Berle and Means (1932) and then elaborated in Jensen and Meckling (1976). Increases in ownership concentration will result in improved monitoring and therefore less expropriation. However, beyond some threshold, a concern arises that the controlling shareholders will expropriate value from minority shareholders, often referred to as the principal principal problem (La Porta, de Silanes, and Shleifer, 1999; Shleifer and Vishny, 1997). Thus, the corporate governance literature predicts that expropriation will be most prevalent in firms with very high and with very low levels of ownership concentration.

Next I explore the relationship between unreported sales and the quality of investor protections. The principal-agent and principal-principal problems described above
may both be mitigated in part by safeguards in the commercial code designed to protect investors. Countries with better investor protection laws are better equipped to curb expropriation (Dyck and Zingales, 2004). When these legal institutions are weak, agency problems are intensified (Qi, Roth, and Wald, 2011; Hope, Thomas, and Vyas, 2011).

I test these relationships using a cross-country dataset of 643 publicly listed firms in 14 countries drawn from the World Bank Enterprise Surveys (WBES). Using firm level measures of sales under-reporting and ownership structure, along with country-level measures of the quality of corporate governance institutions, I test the relationship between unreported sales, ownership concentration and corporate governance institutions.

This study makes a few contributions to the literature. Most importantly, this is the first study to carefully examine the theoretical and empirical links between informality and corporate governance. I find that the corporate governance environment is a key driver of unreported sales. Second, this study contributes to the growing literature on corporate governance issues in emerging economies (Claessens, Djankov, and Lang, 2000; Khanna and Palepu, 2000; Khanna and Rivkin, 2001; Chang and Hong, 2000). Many dimensions of the institutional environment of emerging economies, including under-developed financial markets, inefficient legal systems, and poor enforcement of property rights, may influence the costs and benefits of employing various corporate governance mechanisms (Doidge, Karolyi, and Stulz, 2007). These institutional differences call into question the applicability of lessons learned in a developed country context (Durnev, Errunza, and Molchanov, 2009; Sarkar and Sarkar, 2000).

Finally, this study has implications for policymakers interested in improving public finances in developing countries. For instance, improvements in corporate governance institutions, such as increased protection of minority investors, or increased disclosure requirements, may have the added benefit of reducing participation in the informal
economy and broadening the tax base. In addition, a firm’s corporate governance structure, including ownership structure and potentially other characteristics such as board independence, etc. may be useful information for tax authorities to identify potential tax evaders.

The rest of this study is organized as follows. Section II gives the theory and hypotheses. Section III describes the data and methods while section IV describes the results. Section V concludes.

2.2 Theory and Hypotheses

2.2.1 Expropriation and Informality

Expropriation is defined as the diversion of company assets and investor’s returns by insiders (including management and controlling shareholders). In other words, expropriation is when insiders use the profits of the firm to benefit themselves rather than return the money to outside investors (Shleifer and Vishny, 1997; La Porta, de Silanes, and Shleifer, 1999).

Expropriation can take a range of forms. In its most basic form, theft, insiders simply steal the profits. This is common in many pyramid schemes Shleifer and Vishny (1997), like the multi-billion dollar frauds recently perpetrated by Bernie Madoff and Allen Stanford. Insiders can also expropriate value through related party transactions. For instance, insiders can use transfer pricing or they can sell company assets at preferential prices to tunnel profits out of the firm they control. Finally, managers can expropriate shareholders by entrenching themselves. Entrenchment includes actions taken by management to reduce the effectiveness of mechanisms designed to constrain management behavior (Walsh and Seward, 1990). This can include filling management and board positions with unqualified family members, even when they are not competent to run the firm (Shleifer and Vishny, 1989). Jensen
and Ruback (1983) argue that incompetent managers who resist being replaced may be the most costly form of agency problem.

The term “informal economy” encompasses a broad range of economic activities. The Bank (2007) defines the informal economy as the product of firms, workers, or/and tax payers who decide, voluntarily or not, if and to what extent to enter the formal sector. As this definition suggests, informality is not a discrete choice between completely formal and completely informal. Instead, many firms lie on a continuum of different degrees of formality (Stell and Snodgrass, 2008). For example, firms might choose to operate completely outside of the formal system. Other firms occupy a middle ground, registering with the government, meeting licensing and regulatory requirements, but also choosing to evade a portion of their tax burden by engaging in unreported sales transactions, or hiring employees “off the books.” In this study, I examine a special case of informality that has garnered substantial attention in recent years: the under-reporting of sales revenue by otherwise formal firms (Dabla-Norris, Gradstein, and Inchuauste, 2008; Gatti and Honoratti, 2008; Johnson, Kaufmann, McMillan, and Woodruff, 2000).

2.2.2 Links between Informality and Expropriation

The classic agency problems at the heart of corporate governance, and the tax enforcement problems associated with the informal economy share a number of important similarities. As a starting point, both problems derive from divergent interests between managers, or insiders, and an outside party (shareholders and tax authorities, respectively). If managers derived pleasure from paying taxes, or from working to advance shareholders’ interests instead of their own, then there would be no agency problems or tax evasion.

A second important component of both problems is asymmetrical information. The private information of managers allows them to misrepresent the firm’s profits
to the government to avoid paying their share of taxes. At the same time, private information allows insiders to misrepresent the firm’s profits and their investment prospects to financial markets in order to divert funds for their own use.

Given these basic similarities between the two problems, it is not surprising that many of the prominent theoretical models of the informal economy and tax evasion, and prominent models of corporate governance share striking similarities. In particular, many models in these streams of research are extensions of Becker’s “crime and punishment” model (1968), which analyzes the decision to engage in illegal behavior as a rational choice, weighing the costs and benefits of illegal activity. In these models (Allingham and Sandmo, 1972; Shleifer and Wolfenzon, 2002; Ellingsen and Kristiansen, 2011), the economic agent (hereafter, the manager) has private information on the firm’s income. The manager can choose to avoid sharing the firm’s returns with another party (the tax authorities or investors) by under-reporting income, but he faces some possibility of being caught and punished. The manager chooses what portion of their income to report by balancing the expected value of retained profits against the expected value of the penalty they would face if caught.

In examining informality among formal firms, Dabla-Norris and Koeda (2008); Dabla-Norris, Gradstein, and Inchuauaste (2008) incorporate this basic framework into their models of managers’ decisions to participate in the informal economy. Rausch (1991) and de Paula and Scheinkman (2010) incorporate a simplified version of this model in which small firms face a very low probability of detection and therefore hide all of their income, whereas above a certain size threshold, firms face certain detection and therefore hide none of their income.

Within the finance literature on corporate governance, there are many influential theoretical models incorporating a similar framework where investors now play the role of the tax authorities. For instance, there is a growing literature on imperfect enforcement of financial contracts. Shleifer and Wolfenzon (2002) and Ellingsen and
Kristiansen (2011) incorporate the Becker framework into a corporate finance framework to examine how investor protection and the incentives to expropriate influence the use of equity and debt contracts, ownership concentration, the level of financial development, and firm size.

Other theoretical models of imperfect enforcement (DeMarzo and Fishman, 2007), “semi-verifiable income” (Townsend, 1979; Diamond, 1984; Gale and Hellwig, 1985), and “non-verifiable income” (Bolton and Scharfstein, 1990; Hart and Moore, 1989) also equate hidden income with expropriation. In these models, any income that is not reported to investors is assumed to be diverted by management for their own use.

A recent stream of research on corporate tax avoidance emphasizes the interaction of tax avoidance activities and expropriation concerns in publicly held firms. The key insight to this line of research is that many (legal) tax avoidance activities also create opportunities for managerial opportunism and expropriation (Desai, Dyck, and Zingales, 2007; Desai and Dharmapala, 2009). This is because these activities, aimed at obscuring financial information from tax authorities, also reduce transparency for investors. Two important corollaries can be drawn from this line of reasoning (Desai, Dyck, and Zingales, 2007). First, most activities undertaken by insiders to expropriate value also reduce corporate tax liabilities. Second, activities aimed at enforcing a corporate tax liability make it more difficult for controlling shareholders to expropriate minority investors.

Desai and Hines (2002) examine corporate expatriations, when U.S. firms invert their legal structure so that a subsidiary in a tax haven becomes the parent entity. These inversions generate significant tax savings with limited effect on firm operations, suggesting that markets should react positively to the announcement of such moves. However, Desai and Hines find no strong positive reaction, and in fact they find that the market often reacts negatively to such news, suggesting that investors fears of expropriation outweigh their expectations of tax savings.
Desai, Dyck, and Zingales (2007) present two empirical studies. First, in a sample of Russian firms, they find that market values of companies targeted by tax enforcement actions increased following the announcement of increased enforcement, suggesting that investors fears of expropriation declined in the face of increased tax enforcement. Second, using a country-level panel dataset, they find that increases in corporate tax rates have a smaller effect on corporate tax revenues in countries with weaker corporate governance suggesting that corporate tax avoidance is much more problematic in countries where corporate governance is weak.

Desai and Dharmapala (2009) examine publicly traded US firms, finding that the relationship between tax avoidance and firm value is moderated by corporate governance. Tax avoidance activities increase firm value for those firms characterized by strong corporate governance, but not for those firms characterized by weaker corporate governance.

While this literature is largely concerned with the more complex (and legal) tax avoidance strategies, the same logic applies equally well to informality and simple tax evasion. The reliance on private information and obfuscation underlying both informality and expropriation creates synergy between the two activities. As a result, weak corporate governance institutions can provide incentives for firms to participate in the informal sector. At the same time, factors driving firms to participate in the informal economy may also have negative consequences for the firm’s corporate governance. In the next section, I use property rights protection and political risk as an example to highlight how the institutional context can create governance problems by incentivizing informality.

**Institutions and political risk.** Macroeconomic estimates suggest that the median size of the informal economy is roughly 37 percent of the size of official GDP in developing countries, but only 15 percent of GDP among OECD countries (Schneider and Enste, 2002). To explain this result, economists have increasingly turned to
institution-based arguments, attributing the increased size of the informal economy in developing countries to a lack of market supporting institutions. For instance, Djankov, La Porta, de Silanes, and Shleifer (2002); Friedman, Johnson, Kaufmann, and Zoido-Lobaton (2000); Dabla-Norris, Gradstein, and Inchuauste (2008) provide cross country evidence that the quality of institutions, including corruption, regulation, and the legal environment are all important drivers of informality.

Where these institutions are weak,‘ or failing to support effective markets (Meyer, Estrin, Bhaumik, and Peng, 2009), firms can face a wide range of political and economic risks which place the firms’ interests in jeopardy (Feinberg and Gupta, 2009). For instance, weak property rights protection can increase the risk of expropriation of firms’ assets by government officials (Shleifer and Vishny, 1993).

When faced with an environment characterized by weak institutions, firm must shape their strategy to limit political and economic risks. For instance, a large body of research in the field of International Business examines the mechanisms used by MNCs to overcome limitations in the host country business environment. Delios and Beamish (2001) argue that, in volatile environments characterized by external uncertainty, MNCs should use low control modes of entry because these modes offer increased flexibility (Anderson and Gatignon, 1986). Similarly, Hennart (1988) and Hill, Hwang, and Kim (1990) have argued that a reduced equity stake can lower transaction costs and reduce political risk and uncertainty.

Empirical studies have generally found that greater institutional hazards reduce the likelihood of entry (Gastanaga, Nugent, and Pashamova, 1998; Henisz and Delios, 2001; Wei, 2000), and lead to lower MNC equity stake in foreign subsidiaries (Burton and Inoue, 1987; Delios and Beamish, 1999; Delios and Henisz, 2000; Gatignon and Anderson, 1988; Rodriguez, Uhlenbruck, and Eden, 2005; Uhlenbruck, Rodriguez, Doh, and Eden, 2006). Scholars have also found that firms can limit economic and political risks through forming alliances (Beamish, 1987; Hitt, Dacin, Levitas, Ar-
regle, and Borza, 2000), and through organizing production around intra-firm trade (Feinberg and Gupta, 2009).

Purely domestic firms have only limited access to these strategies. For instance, a domestic firm can only alter its equity stake to the extent that it is able to attract a partner in an equity joint venture. And, due to restrictions on capital and labor mobility, it is impractical for domestic firms to consider exiting the domestic economy.

For these domestic firms, operating at least partially in the informal sector is an alternative mechanism to limit their risk of expropriation by government officials. The informal economy allows firms to reduce the transparency of their operations, thereby reducing the risk of government expropriation (Durnev, Errunza, and Molchanov, 2009; Shi, Magnan, and Kim, 2011). Operating opaquely mitigates the risk that government officials will divert profits, because opacity makes it more difficult for officials to identify profitable firms (Friedman, Johnson, Kaufmann, and Zoido-Lobaton, 2000). The informal economy also provides an environment to exploit business opportunities that may be constrained under a capricious regulatory regime (Johnson, Kaufmann, McMillan, and Woodruff, 2000). Where economic and political risks are greater, firms will hide a larger portion of their activities in the informal sector, shifting their position on a continuum ranging from fully informal to fully formal operations.

One negative consequence of this decision to operate opaquely is that it leaves outside investors wary of providing funds. Recent empirical work on the informal activities of formal firms provides suggestive evidence consistent with this link between informality and investors' fears of expropriation. A growing literature uses cross-country survey data to examine the relationship between informality and access to formal credit channels. Dabla-Norris and Koeda (2008) and Gatti and Honoratti (2008) find a robust negative relationship between informality (among formal firms) and access to credit, including bank credit. Similarly, in studying small Mexican
retail firms, McKenzie and Woodruff (2008) find that access to credit is much higher for those firms that are formally registered. These results are all consistent with the argument that external investors, including lenders, fear expropriation by managers of firms that participate in the informal sector. Thus, firms may be driven into the informal sector by political risks, but their decision to do so creates a corporate governance problem, resulting in reduced access to external credit.

2.2.3 Corporate Governance Mechanisms and Informality

In the previous section, I lay out my argument that unreported sales, usually viewed as a form of participation in the informal economy, can also be viewed as a corporate governance problem. In this section, I build on the corporate governance literature to predict how insiders’ decisions to under-report sales will be influenced by the firm’s corporate governance mechanisms.

Corporate governance mechanisms are economic and legal institutions that reduce managerial discretion and deter expropriation (Daily, Dalton, and Cannella Jr., 2003; Shleifer and Vishny, 1997). These mechanisms provide some assurance that managers will act in the shareholders’ interests (Shleifer and Vishny, 1997).

Scholars have grouped these mechanisms into two categories: internal and external control mechanisms (Boyd, 1994; Rediker and Seth, 1995; Walsh and Seward, 1990). Internal mechanisms include monitoring by the board of directors (Fama and Jensen, 1983; Johnson, Hoskisson, and Hitt, 1993; Walsh and Seward, 1990), monitoring by large shareholders (Shleifer and Vishny, 1986), and compensation contracts that align managers’ incentives with those of the shareholders (Fama and Jensen, 1983). External mechanisms include the market for corporate control, in which management is disciplined by the spectre of market interventions, including hostile takeovers, leveraged buyouts, and proxy contests (Boyd, 1994; Walsh and Seward, 1990). Strong legal protection for minority investors is also an important external mechanism.
When effective, these governance mechanisms provide a range of solutions that reduce agency problems (Gedajlovic and Shapiro, 1998; Shleifer and Vishny, 1997; Dharwadkar, George, and Brandes, 2000). However, in emerging economies many of these governance mechanisms have proven ineffective (Brom, 1999; Khanna and Palepu, 1997; Peng and Heath, 1996). In particular, the market for corporate control is almost completely absent in most emerging economies. Also, the quality of investor protection varies substantially across emerging market countries. Due to weak investor protections, firm financial accounting is often lacking transparency and credibility (Durnev, Errunza, and Molchanov, 2009; Hope, Thomas, and Vyas, 2011; Gibson, 2003), and firms are often closely held (La Porta, de Silanes, and Shleifer, 1999).

In this study, I focus on two corporate governance mechanisms that are particularly problematic in emerging economies, ownership concentration and legal protection of minority investors.

**Ownership Concentration.** It is now generally acknowledged that ownership structure strongly influences corporate governance by influencing shareholders’ power, incentive and ability to monitor management (Shleifer and Vishny, 1997). One dimension of ownership structure, the concentration of ownership, has been particularly emphasized in the agency theoretic literature.

Since Berle and Means (1932), researchers have recognized the principal-agent problem inherent in the corporate organizational form, characterized by professional managers operating firms on behalf of widely diffused shareholders (Eisenhardt, 1989). This agency problem, often referred to as the separation of ownership and control, stems from the fact that widely dispersed shareholders face a free-rider problem, where no individual shareholder has the incentive or the ability to monitor management. The broad dispersion of shareholders then provides management a greater degree of discretion to pursue their own interests at the expense of shareholders (Jensen and

In contrast, large or majority shareholders have both the proper incentives and the ability to monitor and discipline management (Jensen and Meckling, 1976; Shleifer and Vishny, 1986; Gedajlovic and Shapiro, 2002; Thomsen and Pedersen, 2000). Because large shareholders have a claim on a substantial portion of residual profits, the benefits of monitoring management outweigh the costs (Alchian and Demsetz, 1972; Demsetz, 1983), allowing large shareholders to overcome the free-rider problem. In addition, large shareholders have the ability to monitor and discipline management because they can use the threat of takeover (Grossman and Hart, 1980; Shleifer and Vishny, 1986) and because they have substantial voting power to influence the board of directors (Tosi Jr. and Gomez-Mejia, 1989; Fama and Jensen, 1983; Salancik and Pfeffer, 1980).

In line with these arguments, empirical studies conducted in developed countries often find evidence that increased ownership concentration leads to improved financial performance. In the US, Shleifer and Vishny (1986) show that firms’ stock prices increase as the percentage of shares held by the largest shareholders rises. Similarly, Gedajlovic and Shapiro (2002) find a positive relationship between ownership concentration and financial performance among Japanese firms.

Empirical studies also suggest that increased ownership concentration is associated with reduced managerial discretion. Studies of corporate diversification often find evidence that concentrated shareholdings reduce the likelihood of unrelated mergers and acquisitions (Amihud and Lev, 1981) and are associated with lower levels of product diversification (Hill and Snell, 1989). Bergh (1995) finds that ownership concentration increases the likelihood of the sale of unrelated business units. These studies suggest that large shareholders are more effective in preventing management from engaging in empire building, which often benefits management at the expense of shareholders.
However, the concentration of ownership in the hands of a few wealthy investors can present its own challenges. Large shareholders can effectively entrench themselves due to their substantial voting power. These large shareholders may then deprive minority owners of the returns on their investments (Morck, Shleifer, and Vishny, 1988). Especially in emerging economies, characterized by the dominance of family ownership and large shareholders, there is an increased concern that controlling shareholders will expropriate value from minority shareholders (La Porta, de Silanes, and Shleifer, 1999; Shleifer and Vishny, 1997).

Using data on ownership structure of firms in nine East Asian countries, Claessens, Djankov, Fan, and Lang (1999) show that expropriation of minority shareholders by large shareholders is highly prevalent across the region. The authors conclude that such expropriation by controlling shareholders is the main corporate governance problem in these countries. Similarly, Gibson (2003) finds evidence of entrenchment in emerging market firms with a large domestic shareholder. Using a sample of over 1200 firms in eight emerging markets, Gibson examines the link between CEO turnover and firm performance. Gibson finds that managers of poorly performing emerging market firms are replaced at roughly the same rate as poorly performing managers of U.S. firms. However, for those firms with a large domestic shareholder, there is no link between CEO turnover and firm performance, suggesting that corporate governance is ineffective for these firms.

Overall, then, the corporate governance literature suggests that the relationship between ownership concentration and agency problems is not uniform, but curvilinear (Fama and Jensen, 1983; Morck, Shleifer, and Vishny, 1988; McConnell and Servaes, 1990). At very low levels of ownership concentration, no individual shareholder has a strong enough incentive to monitor management, resulting in the classical agency problem. Increases in ownership concentration will result in improved monitoring and therefore less expropriation. However, beyond some threshold a concern arises...
that the controlling shareholders will expropriate value from minority shareholders, as described by La Porta, de Silanes, and Shleifer (1999) and Shleifer and Vishny (1997).

Numerous empirical studies bear out this prediction, finding a non-monotonic relationship between the concentration of ownership and firm performance (Morck, Shleifer, and Vishny, 1988; McConnell and Servaes, 1990). McConnell and Servaes (1990) find that Tobin’s Q increases with insider shareholdings up to an inflection point around 40 percent of total shares, and then decreases beyond that point. Similarly, de Miguel, Pindado, and de la Torre (2004) find an inverted U shaped relationship between ownership concentration and firm value in a sample of Spanish firms, with an inflection point around 35 percent of ownership concentrated in the hands of large shareholders. In line with these studies, Thomsen and Pedersen (2000) find that firm economic performance increases with ownership concentration, but beyond a certain threshold, increased ownership concentration has adverse effect on performance. Thus, the corporate governance literature predicts that expropriation will be most prevalent in firms with very high and with very low levels of ownership concentration.

**Investor Protection.** The principal-agent and principal-principal problems described above may both be mitigated in part by safeguards in the commercial code designed to protect investors. These legal institutions delineate property rights, and the mechanisms through which investors and managers exert control over the corporation, and thereby influence the balance of power between insiders and outside investors (Aguilera and Jackson, 2003). For instance, legal rules such as strict disclosure requirements and restrictions on related party transactions favor minority investors because they reduce information asymmetries and reduce opportunities for expropriation.

Recent research suggests that these legal institutions have broad consequences for firms and for the economy more generally. For instance, La Porta, de Silanes,
Shleifer, and Vishny (1997) attribute cross-country differences in the access of firms to external finance, as well as the breadth and depth of capital markets, to the quality of protection of minority investors. Scholars also suggest that investor protection is an important determinant of firm value (La Porta, de Silanes, Shleifer, and Vishny, 2002), the prevalence of family control of large firms (Fogel, 2006), and the concentration of ownership and control (La Porta, de Silanes, Shleifer, and Vishny, 1997).

Countries that have better investor protection laws are better equipped to curb expropriation (Dyck and Zingales, 2004). When these legal institutions are weak, agency problems are intensified (Qi, Roth, and Wald, 2011; Hope, Thomas, and Vyas, 2011).

2.3 Data and Methods

2.3.1 Data

Firm level data is taken from the World Bank Enterprise surveys, which provide comprehensive company-level data in emerging markets and developing economies. The surveys, constructed using face-to-face interviews with top managers and business owners, cover a broad range of topics including access to finance, corruption, infrastructure, crime, competition, and firm performance. Recent research on informality among formal firms has relied almost exclusively on the WBES data (Gatti and Honoratti, 2008; Dabla-Norris, Gradstein, and Inchuauste, 2008).

I begin by collecting all of the individual country-level WBES datasets from the 2004, 2005, and 2006 rounds of surveys. However, for many of these countries, very few publicly listed firms are included in the sample. For this reason, I restrict the sample to only countries with more than 15 publicly listed firms with ownership data in the sample. This leaves a final sample of 643 firms in 14 countries.
2.3.2 Measures

As in the benchmark study in Chapter 1, the dependent variable, *Reported/True Sales*, is measured as the manager’s response to the following survey item:

> **Recognizing the difficulties many enterprises face in fully complying with taxes and regulations, what percentage of total sales would you estimate the typical establishment in your sector reports for tax purposes?**

Many researchers have used this item as a proxy for informality (or the level of tax compliance) of the focal firm under the assumption that the manager will treat their own firm’s behavior as a baseline (Kenyon, 2008; Dabla-Norris and Koeda, 2008). *Ownership Concentration* is measured as the percentage of ownership held by the largest shareholder.

Country-level measures of the quality of governance institutions are drawn from two sources. *Corporate Governance* and *Judicial/Legal Effectiveness* are drawn from Kaufmann (2004), who constructs these measures from the 2004 Executive Opinion Survey (EOS) conducted by the World Economic Forum. The EOS data captures the perceptions of entrepreneurs and executives on the quality of the local business environment. *Corporate Governance* is the percentage of respondents in the country giving acceptable ratings to questions on corporate governance, minority investor protection, nepotism, and quality of training. *Judicial/Legal Effectiveness* is the percentage of respondents in the country giving acceptable ratings to questions on the quality of the legal system, property protection, and judicial effectiveness.

To supplement these perception-based measures, two additional country-level measures are collected from the 2006 World Bank Doing Business dataset. The Doing Business data provides objective measures of business regulations and their enforcement. *Extent of Disclosure* is an index taking on values between 0 and 10 based on legal disclosure requirements and shareholder voting rules. A higher value reflects
more strict disclosure requirements. *Strength of Investor Protection*, also taking values from 0 to 10, is constructed to reflect a wider range of governance issues, including disclosure requirements, civil liability of company directors and large shareholders, and the ease of bringing shareholder suits.

Finally, *GDP Per Capita* is the 2005 value of GDP per capita in current dollars, taken from the World Development Indicators (WDI) data. This measure is included to control for the level of economic development.

*INSERT TABLE 2.1 HERE*

Table 2.1 summarizes these variables at the country-level. The first column, labeled $N$, gives the number of publicly listed firms in the WBES data for each country. Clearly, the WBES samples for Mexico and India included substantially more publicly listed firms than the samples for the remaining countries. Also, Latin American countries dominate the sample, accounting for ten of the fourteen countries and 60 percent of the firms included in the sample.

Moving on to the variables of interest in the study, Table 2.1 suggests that there is substantial variation across countries in terms of institutional quality, economic development, and informality. For instance, only 12 percent of respondents in Argentina suggest that the judicial/legal environment is satisfactory. In contrast, over 66 percent of respondents gave satisfactory marks to the judicial/legal environment in Chile. Similarly, there is substantial variation in the perceived quality of corporate governance institutions, with only 15 percent of managers giving satisfactory marks in Bolivia, compared to over 62 percent in Chile. Values for *Extent of Disclosure* cover almost the full 0 to 10 scale, while values of *Investor Protection* range from 2.7 to 6.3.

The last two columns give country level averages for the two firm-level variables taken from the WBES data. In the second to last column, I report the average
level of *Ownership Concentration* reported by publicly listed firms in the WBES sample. Clearly, ownership is highly concentrated across the entire sample compared to levels typically observed in the US. However within the sample, there remains substantial variation. The Latin American countries appear to have higher levels of ownership concentration in general, in keeping with La Porta et al.’s findings (1999) that ownership concentration is higher in countries whose commercial code is of French Civil Law origin. Finally, there is striking variation across countries in the prevalence of unreported sales. On average, Korean managers agree that sales under-reporting is quite minor, whereas managers in Ecuador and Panama report that the typical firm only reports roughly half of its sales.

*INSERT TABLE 2.2 HERE*

Table 2.2 provides summary statistics for the sample, including means, standard deviations, and pairwise correlations for the full sample. As expected, the four measures of legal institutions are all highly positively correlated with each other. With a correlation coefficient of 0.94, the two perception based measures, *Judicial/Legal Effectiveness* and *Corporate Governance* are particularly highly correlated. *Ownership concentration* is significantly negatively correlated with each of the investor protection measures. This provides suggestive evidence that ownership concentration is driven by weak investor protection, consistent with the findings of La Porta, de Silanes, and Shleifer (1999). Also, *Reported/True Sales* is significantly positively correlated with each of the investor protection measures, suggesting that corporate governance mechanisms can influence firms’ participation in the informal economy.

### 2.3.3 Methods

The empirical method for this study is quite similar to that of the benchmark model in Chapter 1. For this analysis, I regress the survey measure of *Reported/True Sales*
on the variables of interest.

\[
\text{Reported}/\text{True Sales}_{ij} = \gamma_0 + \gamma_1 \text{Investor Protection}_j + \gamma_2 \text{Concentration}_{ij} \\
+ \gamma_3 \text{Concentration}_{ij}^2 + z\beta 
\]  

(2.1)

where \(\text{Concentration}\) and \(\text{Concentration}^2\) are meant to capture the nonlinear effect of ownership concentration. \(\text{Investor Protection}\) is a measure of the quality of investor protection at the country level. \(z\beta\) is a set of control variables including country fixed effects and GDP per capita.

\[ \text{2.4 Results} \]

In Table 2.3, I present OLS results using only the country level investor protection measures. Column (1) includes only the control variables, \(\text{GDP per capita}\), and country fixed effects, while columns (2) through (5) include the four measures of the quality of investor protection, each entered individually. Sample sizes vary due to missing values of the objective investor protection measures for South Korea and Poland.

*INSERT TABLE 2.3 HERE*

The first row reports the value for the constant term, which has a slightly more complicated interpretation compared to the benchmark model in chapter 1. With country fixed effects included in the model, the constant gives the typical value of \(\text{Reported}/\text{True Sales}\) for the countries for which the fixed effect is excluded from the model, controlling for the other independent variables. Due to dependencies among the independent variables, different country fixed effects are excluded from each model, resulting in variation in the constant term. For instance, the value of the constant is at least 5 percentage points higher in columns 2 through 5 compared
to column 1, in part because the South Korean fixed effect is excluded from these models and South Korea has a high average level of \textit{Reported/True Sales}.

The next row reports the estimated effect of \textit{GDP per capita}, included as a control for overall economic development. When no investor protection measures are included, higher GDP per capita leads to a reduction in unreported sales. However, when investor protection measures are included, the results are mixed, with the coefficient switching signs as different investor protection measures enter the model.

The next two rows give the estimated effect of the perception based measures of the quality of investor protection. The first perception based measure, \textit{Corporate Governance}, suggests that improved investor protections have a strong deterrent effect on hidden sales. A one standard deviation increase in \textit{Corporate Governance} decreases unreported sales by roughly ten percentage point. The second perception based measure, \textit{Judicial/Legal Effectiveness} does not appear to have an economically meaningful effect on unreported sales. In fact, increasing \textit{Judicial/Legal Effectiveness} from the lowest value to the highest value observed in the sample would increase unreported sales by roughly one percentage point.

The next two rows give the estimated effect of the objective measures of the quality of investor protection. \textit{Extent of Disclosure} has a deterrent effect on unreported sales. A one standard deviation increase in \textit{Extent of Disclosure} decreases unreported sales by roughly 2.5 percentage points. Put another way, were Bolivia to adopt Chile’s disclosure rules, these estimates suggest that unreported sales would drop by roughly 6 percentage points. The second objective measure, \textit{Investor Protection}, also has a deterrent effect on unreported sales. A one standard deviation increase in \textit{Investor Protection} decreases unreported sales by roughly 6 percentage points. Taken together, these results provide strong evidence that the quality of legal protection of investors is an important predictor of firms’ decisions to participate in the informal economy.
In Table 2.4, I present OLS results using both the country level investor protection measures and firm level measures of *Ownership Concentration.* The sample size for these models is reduced because some firms in the WBES data do not report ownership data. Columns (1) and (2) include only the ownership concentration measures and country fixed effects, while columns (3) through (7) include GDP per capita and the four measures of the quality of investor protection, each entered individually.

*INSERT TABLE 2.4 HERE*

Column 1 suggests that there is no significant linear effect of ownership concentration on unreported sales. However, the next six columns provide robust evidence of a nonlinear relationship. In each model specification, I find a significant inverted-U shaped relationship between *Ownership Concentration* and *Reported/True Sales.* At low levels of *Ownership Concentration,* a marginal increase in concentration is associated with a decrease in unreported sales. But beyond a threshold of roughly 64 to 66 percent, an increase in concentration is associated with an increase in unreported sales. These results are robust to the inclusion of all of the investor protection measures.

The results for the quality of investor protection largely mirror the results reported in Table 3. Once again, *Corporate Governance,* *Extent of Disclosure,* and *Investor Protection* all have a significant deterrent effect on unreported sales, and the magnitudes of the effects are quite similar. The only noticeable departure from Table 3 is the effect of *Judicial/Legal Effectiveness.* Controlling for *Ownership Concentration,* improved *Judicial/Legal Effectiveness* appears to decrease unreported sales, but the magnitude of the effect is moderate compared to the other investor protection measures.
2.5 Summary and Extensions

Where previous research has largely treated unreported sales as a form of participation in the informal economy, this study explores this phenomenon as a corporate governance problem, stemming from inadequate monitoring and protection of minority shareholders. Using a cross-country survey sample of publicly listed firms, I test how unreported sales are influenced by the firm’s corporate governance environment, including legal protection of investors and concentration.

Consistent with theory and with previous studies, unreported sales are strongly influenced by the corporate governance environment. I find robust evidence that the principal-agent problem and the principal-principal problem are both important drivers of unreported sales. Most importantly, I find that legal protection of minority investors plays an important role in managers’ decisions to participate in the informal economy. This suggests that improvement of these institutions may have dual benefits for the economy, improving financial markets and broadening the tax base.

While this study is a promising step, there are limitations. To start, this study only examines a narrow range of corporate governance mechanisms: investor protection and ownership concentration. In the next chapter, I examine how the underreporting of sales is influenced by other important governance issues in emerging economies, including business group affiliation and cross-listing on US and European exchanges.
Chapter 3

Informality, Expropriation and Corporate Governance: Evidence from India

3.1 Introduction

In this study, I build on the previous two chapters to examine the relationship between corporate governance and unreported sales among Indian manufacturing firms. Using the empirical strategy introduced in the first study, I am able to test the robustness of previous results from the cross-country study in Chapter 2, while simultaneously examining new questions which cannot be addressed with the available survey data.

Consistent with the cross-country study in Chapter 2, I find that ownership concentration has a significant nonlinear relationship with unreported sales. An increase in ownership concentration is associated with a reduction in unreported sales up to a certain threshold, roughly 50 to 55 percent of shares held by the largest shareholder. Beyond that threshold, increased concentration is associated with an increase in unreported sales.
Next, I examine how expropriation differs for firms that are cross-listed on US and European exchanges. Many recent studies argue that cross-listing limits the ability of insiders to expropriate value from external investors (Doidge, Karolyi, and Stulz, 2004; Reese Jr. and Weisbach, 2002). Consistent with these arguments, I find that cross-listed firms report a larger portion of their sales.

Finally, I examine how unreported sales are influenced by affiliation with an Indian business group. In developing economies, many researchers argue that business groups create value by filling “institutional voids,” allowing firms to internalize transactions that would be quite difficult due to labor and capital market imperfections (Khanna and Palepu, 2000). However, a contrasting view argues that business groups destroy value due to expropriation and conflicts of interests Morck, Wolfenzon, and Yeung (2005). My findings are more consistent with the pessimistic view. I find that business group affiliated firms engage in more extensive under-reporting of sales than non-group firms. Furthermore, I find that ownership concentration and cross-listing have no influence on the behavior of group firms, suggesting that these governance mechanisms are insufficient to constrain the behavior of insiders of Indian business groups.

This study makes important contributions to the literature. The novel empirical strategy used in this study provides an effective new tool to study expropriation among publicly listed firms. Because I estimate the extent to which revenue is understated to financial markets, as opposed to tax authorities, this method can be seen as a direct, albeit partial, measure of expropriation. In contrast, much of our knowledge of expropriation comes from empirical studies that only examine expropriation indirectly. For instance, scholars have used investors’ fears of expropriation as the causal mechanism relating ownership structure and firm value (Morck, Shleifer, and Vishny, 1988; McConnell and Servaes, 1990; de Miguel, Pindado, and de la Torre, 2004), but none of these studies actually measure expropriation. This leaves open the question,
are investors’ fears of expropriation warranted? This study suggests that the answer is yes. Similarly, many previous studies have argued that cross-listing on US and European exchanges signals a commitment to not expropriate, but this leaves open the question of whether or not this signal is an accurate one.

This is also one of the few studies to directly compare the intensity of expropriation among business group firms and non-group firms. The majority of the empirical literature on tunneling relies on group relationships between firms to identify evidence of expropriation (e.g. the stock market reaction of one firm to the announcement of an action taken by an affiliate). Therefore these studies cannot compare the behavior of group and non-group firms. As such, this paper provides some of the first rigorous evidence that, on average, group affiliated firms truly expropriate more than their non-group counterparts.

The rest of this study is organized as follows. Section II discusses the prior literature. Section III describes the data and methods, while section IV describes the results. Section V concludes.

3.2 Prior Literature

3.2.1 Ownership Concentration

As described in Chapter 2, the corporate governance literature suggests that the relationship between ownership concentration and agency problems, including expropriation, are non-monotonic. At very low levels of ownership concentration, no individual shareholders have a strong enough incentive to monitor management, leaving management free to pursue their own interests at the expense of shareholders. This is the classical principal-agent problem described by Berle and Means (1932) and Fama and Jensen (1983). For these firms with widely dispersed ownership, an increase in ownership concentration will result in improved monitoring and therefore less expro-
However, beyond some threshold a concern arises that the controlling shareholders will expropriate value from minority shareholders. (La Porta, de Silanes, and Shleifer, 1999; Shleifer and Vishny, 1997). This concern often referred to as the principal-principal problem, is especially important in emerging economies, characterized by the dominance of family ownership and large shareholders (La Porta, de Silanes, and Shleifer, 1999; Shleifer and Vishny, 1997).

In an emerging economy context, the combination of principal-agent and principal-principal problems suggest that agency problems will be most severe in firms with very high and with very low levels of ownership concentration.

### 3.2.2 Business Groups

While ownership concentration is an important corporate governance mechanism, the identity of owners can also have important implications for corporate governance. For instance, institutional investors and individual investors may have quite divergent investing goals and risk preferences (McConnell and Servaes, 1990; Thomsen and Pedersen, 2000). For instance, some institutional investors have shorter time-horizons for their investments, while holding companies often buy and hold their investments for longer periods.

One type of owner that is particularly important in many developing countries, including India, is the business group. Defined as sets of legally independent firms bound together in persistent formal and/or informal ways” (Granovetter, 1995), business groups are a ubiquitous feature of developing economies (Khanna, Kogan, and Palepu, 2006).

In developing economies, many researchers argue that business groups create value by filling "institutional voids," allowing firms to internalize transactions that would be quite difficult due to labor and capital market imperfections (Khanna and Palepu,
2000). However, a contrasting view argues that business groups destroy value due to expropriation and conflicts of interests Morck, Wolfenzon, and Yeung (2005). Business groups concentrate control in the hands of insiders who often hold relatively small equity stakes in the firms they control. Furthermore, the lack of transparency and difficulties associated with monitoring group affiliated firms leave plenty of opportunities for managers to expropriate value from minority investors.

A common way that business groups divert returns is through related party transactions in which both parties are managed by the same controlling shareholders (Bae, Kang, and Kim, 2002; Bertrand, Mehta, and Mullainathan, 2002). Johnson, Kaufmann, McMillan, and Woodruff (2000) refer to these self-dealing transactions of group-affiliated firms as “tunneling.” Insiders can use a range of different related-party transactions to expropriate returns from minority investors. For instance, insiders can use intra-group loans, transfer pricing, or they can sell company assets at preferential prices, to divert profits from the firm they control. Chang (2003) finds that controlling shareholders of group-affiliated public firms in Korea transfer profits to other affiliates through intra-group trade. Faccio, Lang, and Young (2001) show that controlling shareholders of East Asian corporations obtained extensive access to related party loans, which facilitated expropriation of minority shareholders. Due to these concerns, investors are understandably wary of providing funds to business group firms (Luo, Chung, and Sobczak, 2009). Khanna and Palepu (2000) find that foreign investors are less likely to invest in Indian firms affiliated with business groups, especially those firms that engage in extensive intra-group financial transactions.

3.2.3 Cross-Listing

Weak corporate governance and poor protection of minority shareholders provide insiders with opportunities for expropriation at the expense of outside investors. However, these opportunities for expropriation come at a cost to insiders. When strong
legal institutions are not in place, investors are less willing to provide funds, making it difficult for many developing country firms to raise equity capital or debt financing (La Porta, de Silanes, Shleifer, and Vishny, 1997) and it causes their equity to be worth less (La Porta, de Silanes, Shleifer, and Vishny, 2002). However, firms that wish to overcome these credit constraints can often do so by cross-listing their shares in the U.S. and in Europe.

To a large extent, corporate governance involves constraints that managers voluntarily put on themselves, to induce investors to provide more funds (Shleifer and Vishny, 1997). Coffee (1999, 2002) and Stulz (1999) argue that cross-listing in the US provides such constraints, limiting the ability of controlling shareholders to expropriate value. Thus, controlling shareholders can lower their cost of capital by “bonding” themselves to assure investors that they will not be expropriated.

Cross-listing provides enhanced protection of minority investors for a number of reasons. First, Cross-listed firms are subject to ongoing disclosure and reporting obligations, as well as monitoring and enforcement by the Securities and Exchange Commission (Doidge, 2004). Restrictions include insider trading rules and antifraud provisions that restrict controlling shareholders from engaging in opportunistic behavior.

In addition to a stronger legal environment, cross-listing also provides firms with greater media and analyst coverage, allowing investors to more easily monitor the firm (Baker, Nofsinger, and Weaver, 2002; Lang, Lins, and Miller, 2003). Doidge, Karolyi, Lins, Miller, and Stulz (2009) find that analyst coverage increases, even for U.S. cross-listings that do not subject foreign firms to the most stringent U.S. securities regulations, such as PORTAL and OTC listings.

Recent empirical studies provide supporting evidence that cross-listing on US and European exchanges constrains managerial discretion and quiets investors’ fears of expropriation (Reese Jr. and Weisbach, 2002; Doidge, 2004). For instance, Reese Jr.
and Weisbach (2002) show that firms from countries with poor investor protection are able to raise more equity capital at home after cross-listing on a US exchange. Using data for companies with dual class shares, Doidge (2004) finds that voting premia are smaller for firms that cross-list in the U.S., suggesting that cross-listing in the U.S. improves the protection afforded to minority investors and decreases the private benefits of control. Doidge (2004) also finds that both the high- and low-voting share classes benefit when a U.S. listing is announced, although the low-voting class benefits relatively more. Doidge (2004) finds that cross-listed firms have greater firm value than other firms, and the effect is larger for firms with weaker investor protection.

3.3 Data and Methods

3.3.1 Data

The primary data source used in this study is the Prowess Database, compiled by the Center for Monitoring the Indian Economy (CMIE). This database covers the majority of manufacturing sector output in India and has been used extensively in economic research (Khanna and Palepu, 2000; Bertrand, Mehta, and Mullainathan, 2002). I begin by restricting my analysis to domestically owned publicly-listed firms in the fourteen largest Indian states, and the ten largest (2 digit level) manufacturing industries that are represented in the CMIE dataset. The sample for these industries includes 22,116 firm-year observations for the period from 2001 to 2007. However, many of these observations have missing values for the variables of interest, especially data on equity ownership. Excluding observations that are missing values for the variables of interest leaves 7,178 firm-year observations.

I then make a number of more targeted exclusions. It is common for manufacturing firms in India to act not only as producers, but also as wholesalers, meaning that many manufacturing firms sell products that they did not produce. For the purposes
of this study, these sales are problematic. The analysis relies crucially on an estimated production relationship between inputs and outputs so any additional sales or inventory stocks that do not reflect in-house production will add unnecessary noise to the analysis. To address this problem, I construct a ratio of purchased finished goods to sales of in-house-produced goods and exclude observations with a ratio larger than 0.1. I tried other cut-off values (e.g. 0.05, 0.25) and the results were largely unchanged. This modification reduces the sample to 6,138 firm-year observations.

Finally, I exclude firm-year observations with large discrepancies or unreasonable data. For instance, I exclude firms that report paying no wages. I also exclude firms with substantial divergence between reported change in inventory and calculated year-on-year change in inventory. The Prowess database contains data on end-of-year inventory stocks and change in end-of-year inventory stocks. Allowing for some rounding error, calculated year-on-year change in inventory stocks should be approximately equal to the value provided in the dataset, and in most cases the two values are quite close. However, I discard roughly 8 percent of the remaining observations where the discrepancy between the two values exceeds the cut-off values established in Chapter 1. This restriction leaves a final sample of 5,643 observations on 1,299 firms covering the period 2001 to 2007.

3.3.2 Measures

**Inputs.** To control for changes in total output, I use measures of changes in input consumption, constructed using expenditure data. Labor expense is measured using total labor compensation. The more conventional measure of labor input, “number of employees,” is not available for the majority of firms in my sample, especially before 2001. Change in capital stock is measured as the net investment in fixed assets. Energy expense is measured as fuel and energy expenses. Material inputs are measured as raw materials expenses net of change in inventory of raw materials. Once
input consumption measures have been constructed, changes in inputs are constructed using first differences, subtracting the previous year’s value from the value for the current year.

**Outputs.** Reported sales are measured by adding the line items “sale of goods” plus “sale of scrap.” Scrap is also included in the inventory stock measure. Inventory is measured as the end-of-year stock of finished and semi-finished goods. Firms in India are required to use “first in first out” inventory accounting methods, suggesting that end of year inventory stocks should reflect current prices and costs. As with the input measures, changes in output are constructed as first differences.

**Prices.** Output prices are disaggregate wholesale price indices provided by the Indian Ministry of Commerce and Industry which generally correspond to the four-digit industry level. Materials prices are constructed as weighted averages of the same price indices where the weights are determined according to the 1998-99 Input-Output matrix. Energy prices are measured as the fuel and energy wholesale price index. The capital purchase price is measured as the machinery price index, and the capital rental rate is constructed using the Hall and Jorgenson (1967) method. Wages are measured as the industrial sector labor consumer price index.

**Ownership Concentration** is constructed using the equity ownership data provided in the CMIE data. Specifically, I use the item “promoters’ holdings” which includes both the direct holdings of the controlling interests in the firm and the shares held by companies controlled by those parties. Including both direct and indirect holdings is important in a country such as India, where cross-shareholding and pyramidal ownership structures are commonplace. For the WBES sample, ownership concentration is the percentage of ownership held by the largest shareholder.

**Crosslisting.** Firms that cross-list on US and European exchanges are identified using data provided by the Bank of New York and Citibank. Specifically, I identify 25 firms that are in the Prowess sample and cross-listed on the NYSE, NASDAQ,
LSE or Luxembourg stock exchanges between 1992 and 2007. Firms that list via PORTAL, the Pink Sheets, or through Level 1 ADRs are not subject to nearly the same regulatory scrutiny (Doidge, 2004) so these firms are not identified as cross-listed.

In Table 3.1, I present the correlation tables and summary statistics for the sample used in the analysis. The means and standard deviations reported in the first two columns include observations over the full sample period. However, the correlation table is constructed using only cross-sectional data from financial year 2004. The results are similar when other years are chosen. As expected, change in sales and the weighted change in inputs are quite highly correlated, reflecting the fact that consumption of inputs closely tracks production of outputs. Also, cross-listing and business group affiliation are positively correlated with changes in sales and changes in inputs, suggesting that cross-listed firms grew at a faster rate than other firms over the sample period.

*INSERT TABLE 3.1 HERE*

### 3.3.3 Methods

To examine the relationship between unreported sales and corporate governance mechanisms, I model the firm’s ratio of reported sales to true sales as a linear function of five covariates:

\[
\lambda_{ijkt} = \lambda_0 + \lambda_1 GDP_{growth_t} + \lambda_2 Concentration_{ijkt} + \lambda_3 Concentration_{ijkt}^2 \\
+ \lambda_4 Businessgroup_i + \lambda_5 Cross-listing_i
\]  

(3.1)

*Concentration* and *Concentration*\(^2\) are meant to capture the nonlinear effect of ownership concentration. *Business Group* is an indicator set to 1 if the firm is a member of an Indian business group. *Cross-listing* is an indicator set to 1 if the firm is
cross-listed on a US or European exchange. GDP growth represents the year-on-year growth in real GDP. The right hand side of eq. (16) is substituted into eq. (10) from Chapter 1, resulting in a model with a series of interactions:

$$\Delta S_{ijkt}^* = \lambda_0[−\Delta^2 I_{ijkt}] + \lambda_1[−\Delta^2 I_{ijkt} \times GDP_{growth_t}]$$
$$+ \lambda_2[−\Delta^2 I_{ijkt} \times Concentration_{ijkt}] + \lambda_3[−\Delta^2 I_{ijkt} \times Concentration^2_{ijkt}]$$
$$+ \lambda_4[−\Delta^2 I_{ijkt} \times Businessgroup_i] + \lambda_5[−\Delta^2 I_{ijkt} \times Cross\text{-}listing_i]$$
$$+ \gamma_0[+\Delta X_{ijkt}] + \cdots + \gamma_5[\Delta X_{ijkt} \times Cross\text{-}listing_i] + z\beta$$
$$+ \sum\sum d_{kt} S_{ijkt-1}^* + \sum\sum a_{jt} S_{ijkt-1}^* + v_{kt} + \Theta_{jt} + \epsilon_{ijkt} \quad (3.2)$$

Two points are worth noting about the application of this empirical strategy to examine expropriation, as opposed to informality. First, because I estimate the under-reporting of revenue in financial reports, as opposed to tax filings, this method can be seen as a direct, albeit partial, measure of expropriation. In fact, the under-reporting of income to investors is a common way to model expropriation in the corporate finance and corporate governance literature (Shleifer and Wolfenzon, 2002; Ellingsen and Kristiansen, 2011).

Second, because I do not have data on prices and quantities, this method will not differentiate between the legal manipulation of transfer prices and outright theft. As a simple numerical example to illustrate this point, say two identical firms, A and B, both sell 100 units of output. The manager of firm A sells to a related party and charges a preferential price, discounting the value by 50 percent. The manager of firm B reports a transaction for 50 units at full price, and steals the remaining revenue. The revenue reported to investors in either case is the same even though firm A’s actions may be technically legal while firm B’s actions are clearly illegal.

While this inability to distinguish between the behavior of firm A and firm B would be a concern if the objective is to identify illegal behavior, it could actually be
a strength when studying expropriation. From an investor’s perspective, the actions of firm A and firm B are equivalent because both actions serve equally well to divert profits away from the firm and it’s investors.

As in Chapter 1, I employ a two step weighted least squares estimator, as described in Greene (2003), where the standard errors are assumed to be a linear function of firm size (measured as the firm’s labor expenses). I also employ a maximum likelihood estimator in which the standard error is modelled as a linear function of firm size, and both the standard error and the model coefficients are jointly estimated.

### 3.4 Results

In Table 3.2, I present the results using the CMIE financial data. Table 3.2.A presents the maximum likelihood results while 11.B gives weighted least squares results. In both sets of results, columns (1) and (2) include only GDP growth and the Ownership Concentration measures. Columns (3) and (4) include the indicators for business group affiliation and cross-listing, entered individually, while column (5) includes the full set of regressors.

*INSERT TABLE 3.2 HERE*

Reading across the top row of maximum likelihood estimates, the coefficient on Change in Inventory is interpreted as the baseline ratio of reported sales to true sales for the typical firm, with an average level of Ownership concentration facing 2005 levels of GDP growth. The values fall in the range of roughly 0.89 to 1.00 and none are significantly different from unity. I can not reject the hypothesis that the typical firm in this sample accurately reports their sales revenue. One potential explanation for the difference between these estimates and those found in the first study is self-selection. Less transparent firms are less likely to report detailed ownership information, and
are therefore excluded from the sample. Therefore it is possible that the sample skews toward more transparent, better governed firms.

The next five rows give the estimated interaction effect of each of the correlates with Change in Inventory. As outlined in section 3.3, these interactions are interpreted as the effects of the correlates on the ratio of reported sales to true sales. Column (1) suggests that Ownership concentration does not have a significant linear effect on unreported sales. However, the next four model specifications do find a significant non-linear relationship. Consistent with the results reported in Chapter 2, Ownership concentration has an inverted-U shaped relationship with the ration of reported to true sales. At low levels of Ownership concentration, a marginal increase in concentration is associated with less hidden sales. But beyond a threshold of roughly 51 to 53 percent, an increase in concentration is associated with more hidden sales.

Consistent with the literature on “tunneling,” Business Group firms appear to engage in more extensive under-reporting of sales than non-group firms. Point estimates suggest that the difference between group and non-group firms is roughly 12 to 13 percent of total sales. Finally, Cross-listing and GDP growth appear to have no significant relationship with unreported sales in the full sample.

The weighted least squares results, reported in Table 3.2.B, provide some mixed support for the maximum likelihood estimates. For instance, the baseline estimates of the typical ratio of reported to true sales is similar across both sets of results. Also group affiliation is associated with more extensive under-reporting of sales, as in maximum likelihood results. However the weighted least squares results differ in important ways. First, the ownership concentration measures lose significance, and even switch signs. Also, Cross-listing is strongly significant and positive, suggesting that cross-listing firms truly are better governed than other domestic firms. However, caution should be taken in interpreting these results as causal. Instead, engaging in less expropriation and cross-listing can be seen as two components of an overarching
strategy to improve access to external finance.

Taken together, the results reported in Table 3.2 are mostly inconclusive, only reaching agreement on the role of business group affiliation. One possible explanation for the conflicting results is that the model is misspecified. If business-group firms have greater opportunities for expropriation than other firms, then perhaps governance mechanisms like cross-listing and ownership concentration will do little to constrain the opportunistic behavior of insiders. In Tables 3.3 and 3.4, I explore this possibility, splitting the sample into group affiliated and non-group firms. Columns (1), (2), and (3) report the results for the subsample of group-affiliated firms, while columns (4), (5), and (6) report the results for the subsample of non-group firms.

*INSERT TABLE 3.3 AND 3.4 HERE*

Compared to Table 3.2, the results in Tables 3.3 and 3.4 present a much more consistent picture. Across both the maximum likelihood and weighted least squares results, the baseline estimates of the ratio of reported to true sales is substantially lower for group firms than non-group firms, supporting the main consistent result in Table 3.2. Also, across both sets of results, Ownership concentration, Cross-listing, and GDP growth have no influence over the behavior of group affiliated firms, but have a significant effect on non-group firms.

Among non-group firms, Ownership Concentration has an inverted U shaped relationship with the ratio of reported to true sales, consistent with the cross-country results reported in Chapter 2. For these firms, the principal agent problem and the principal-principal problem are both important drivers of unreported sales. For group affiliated firms, ownership concentration has no such effect, perhaps because the controlling interests in business groups can exert control even in the absence of substantial equity holdings.

Similarly, Cross-listing is associated with a substantially higher ratio of reported to true sales for non-group firms. For these firms, cross-listing successfully dete-
portunistic behavior and expropriation. However group firms are unaffected, perhaps due to their ability to conceal their expropriation through related party transactions. Finally, unreported sales are strongly countercyclical for non-group firms, consistent with the results in Chapter 1.

3.5 Summary and Extensions

When managers fail to report firm revenue they are engaging in outright theft, stealing from tax authorities and from shareholders. Where previous research has largely treated unreported sales as a form of participation in the informal economy, this study explores this phenomenon as a corporate governance problem, stemming from inadequate monitoring and weak protection of minority shareholders. Using a novel method to examine hidden sales, I test how hidden sales are influenced by the firm’s corporate governance environment, including business group affiliation, ownership concentration, and cross-listing on US and European exchanges.

The results of this study suggest that corporate governance, and the identity of owners in particular, can be an important driver of unreported sales. I find that the identity of owners has a direct influence on unreported sales, and perhaps more importantly, identity also moderates the effectiveness of other governance mechanisms, like cross-listing and the concentration of ownership.

Future research can further examine the moderating role of ownership identity on corporate governance outcomes. For instance, does ownership identity influence market reactions to corporate governance reform, or reactions to announcements of improved corporate governance practices at the firm level?

Together with the cross-country survey results in Chapter 2, this study provides strong evidence that ownership concentration has an important non-linear relationship with unreported sales. These results suggest that the principal-agent problem
and the principal-principal problem are both important drivers of sales underreporting.

As usual, this study is not without its limitations. First, the measure used in this study fails to capture important forms of expropriation, such as the expropriation of firm assets, entrenchment, or excessive executive compensation. Therefore, this study gives only a partial view of expropriation and how it is constrained by corporate governance mechanisms.

Furthermore, I left many important factors influencing the quality of corporate governance unexplored. Future research can examine how unreported sales are influenced by the independence and composition of the board of directors, or by the structure of executive compensation. Furthermore, unreported sales may have a strong negative impact on the firm’s ability to obtain external funding, suggesting that hidden sales will be associated with credit constraints which may hurt the strategic flexibility of the firm. Future research can also examine the role of outside debt, and the monitoring of banks.

Another promising avenue for future research is to examine how unreported sales change in response to corporate governance reforms. It may also be worthwhile to examine how decisions to hide sales are related to other behaviors associated with tax avoidance, such as the manipulation of accruals (Desai and Dharmapala, 2009). Do firms hide sales as part of a larger tax avoidance strategy, or do these other strategies serve as substitutes? I leave these and other questions to future research. RUTGERS BUSINESS SCHOOL
Bibliography


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LR tests:  
Industry Effects=0 12.56 25.66** 15.72 14.68 17.62  
State Effects=0 106*** 150*** 131*** 395*** 625***

*Regulation Burden* is the percentage of managers who report that industry regulation is a “major” or “very severe problem for the operation and growth of [their] business.” *Regulatory Discretion* is the percentage of respondents who report that they “disagree in most cases” or “fully disagree” with the statement: “In general, government officials’ interpretations of regulations affecting my establishment are predictable.” *Corruption Burden* is constructed in the same manner as *Regulatory Burden*, as the percentage of managers who report bureaucratic corruption is a “major” or “very severe problem for the operation and growth of [their] business.” *Corruption Prevalence* is the percentage of managers who report that it is typical for firms in their sector to make informal payments or gifts to government officials. *Monitoring* is the average number of required visits with tax authorities reported by local managers. The likelihood ratio test statistics reported in the bottom two rows test the joint significance of industry fixed effects and state fixed effects against a full model including both sets of effects. The LR tests reported in the first four columns are estimated using linear probability models while the fifth column is a linear count data model. *p < .10; ** p < .05; *** p < .01*
Table 1.2: Summary Statistics and Correlation Table for the CMIE Data

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Means and standard deviations include the full sample (N=14,014). Correlation table is restricted to financial year 2004 (N=1,409). * p < .01
Table 1.3: Summary Statistics and Correlation Table for the WBES Data

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* p < .01
Table 1.4: Determinants of $\lambda$, the Ratio of Reported Sales to True Sales

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Each variable preceded by “x” is interacted with Change in Inventory. Control variables included in the model but not reported include industry-year and state-year fixed effects, industry-year and state-year fixed effects interacted with lagged sales, the main effect of each independent variable listed above, weighted inputs, and the interactions of weighted inputs with the independent variables listed above. Numbers in parentheses are standard errors. The null hypothesis for Change in Inventory is that the coefficient is equal to 1. All other coefficients are tested against the null hypothesis that the coefficient is equal to zero.

* $p < .10$; ** $p < .05$; *** $p < .01$
Table 1.5: Determinants of $\lambda$, Benchmark Survey Estimates

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Robust standard errors are in parentheses. The null hypothesis for the constant term is that the coefficient is equal to 1. All other coefficients are tested against the null hypothesis that the coefficient is equal to zero.

* $p < .10$; ** $p < .05$; *** $p < .01$
Table 2.1: Country-level Measures of Corporate Governance

<table>
<thead>
<tr>
<th>Country</th>
<th>N</th>
<th>Judicial / Legal Governance Effectiveness</th>
<th>Extent of Disclosure</th>
<th>Strength of Investor Protection</th>
<th>GDP/pop</th>
<th>Mean Ownership Concentration</th>
<th>Mean Reported / True Sales</th>
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</table>

*Corporate Governance* is the percentage of respondents in the country giving acceptable ratings on corporate governance, minority investor protection, nepotism, and quality of training. *Judicial/Legal Effectiveness* is the percentage of respondents in the country giving acceptable ratings to the quality of the legal system, property protection, and judicial effectiveness. *Extent of Disclosure* is an index taking on values between 0 and 10 based on legal disclosure requirements and shareholder voting rules. A higher value reflects more strict disclosure requirements. *Strength of Investor Protection*, also taking values from 0 to 10, is constructed to reflect a wider range of governance issues, including disclosure requirements, civil liability of company directors and large shareholders, and the ease of bringing shareholder suits. *GDP Per Capita* is the 2005 value of GDP per capita in current dollars, taken from the World Development Indicators (WDI) data. *Mean Ownership Concentration* is the country-level average share of ownership held by the largest shareholder among publicly listed firms in the WBES sample. *Mean Reported/True Sales* is the mean value of the survey measure of Reported/True Sales reported by publicly listed firms in the WBES sample.
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*p < .01
Table 2.3: Country-Level Determinants of the Ratio of Reported Sales to True Sales

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<td>643</td>
<td>643</td>
<td>566</td>
<td>566</td>
</tr>
<tr>
<td>R²</td>
<td>0.172</td>
<td>0.172</td>
<td>0.172</td>
<td>0.149</td>
<td>0.149</td>
</tr>
<tr>
<td>AIC</td>
<td>6186</td>
<td>6186</td>
<td>6186</td>
<td>5508</td>
<td>5508</td>
</tr>
</tbody>
</table>

Numbers in parentheses are robust standard errors, clustered at the country level. For the constant term, the null hypothesis is that the coefficient is equal to 1. All other coefficients are tested against the null hypothesis that the coefficient is equal to zero. * p < .10; ** p < .05; *** p < .01
Table 2.4: Firm-Level and Country-Level Determinants of the Ratio of Reported Sales to True Sales

<table>
<thead>
<tr>
<th>Variable</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>86.889***</td>
<td>88.781**</td>
<td>84.844***</td>
<td>90.558**</td>
<td>93.77*</td>
<td>89.314**</td>
<td>91.671*</td>
</tr>
<tr>
<td></td>
<td>(1.849)</td>
<td>(5.043)</td>
<td>(4.482)</td>
<td>(4.723)</td>
<td>(4.727)</td>
<td>(5.49)</td>
<td>(5.099)</td>
</tr>
<tr>
<td>Concentration</td>
<td>0.023</td>
<td>0.468**</td>
<td>0.468**</td>
<td>0.468**</td>
<td>0.468**</td>
<td>0.566**</td>
<td>0.566**</td>
</tr>
<tr>
<td></td>
<td>(0.031)</td>
<td>(0.19)</td>
<td>(0.19)</td>
<td>(0.19)</td>
<td>(0.19)</td>
<td>(0.217)</td>
<td>(0.217)</td>
</tr>
<tr>
<td>Concentration squared</td>
<td>-0.004**</td>
<td>-0.004**</td>
<td>-0.004**</td>
<td>-0.004**</td>
<td>-0.004**</td>
<td>-0.004**</td>
<td>-0.004**</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
<td>(0.002)</td>
</tr>
<tr>
<td>GDP/pop.</td>
<td>0.003***</td>
<td>-0.000</td>
<td>-0.003***</td>
<td>-0.001***</td>
<td>-0.001***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>CG index</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.686***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.038)</td>
<td></td>
</tr>
<tr>
<td>Judicial/legal effectiveness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.061***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.013)</td>
<td></td>
</tr>
<tr>
<td>Extent of disclosure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.985***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.063)</td>
<td></td>
</tr>
<tr>
<td>Strength of investor protection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.120***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.763)</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>592</td>
<td>592</td>
<td>592</td>
<td>592</td>
<td>592</td>
<td>519</td>
<td>519</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.175</td>
<td>0.182</td>
<td>0.182</td>
<td>0.182</td>
<td>0.182</td>
<td>0.159</td>
<td>0.159</td>
</tr>
<tr>
<td>AIC</td>
<td>5703</td>
<td>5700</td>
<td>5700</td>
<td>5700</td>
<td>5700</td>
<td>5055</td>
<td>5055</td>
</tr>
</tbody>
</table>

Numbers in parentheses are robust standard errors, clustered at the country level. For the constant term, the null hypothesis is that the coefficient is equal to 1. All other coefficients are tested against the null hypothesis that the coefficient is equal to zero. * $p < .10$; ** $p < .05$; *** $p < .01$
Table 3.1: Summary Statistics and Correlation Table

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Change in Sales</td>
<td>9.56</td>
<td>52.56</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Change in Inventory</td>
<td>-0.19</td>
<td>10.87</td>
<td>0.22*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Change in Inputs</td>
<td>8.1</td>
<td>37.23</td>
<td>0.71*</td>
<td>-0.18*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Ownership Concentration</td>
<td>50.05</td>
<td>17.33</td>
<td>0</td>
<td>-0.08</td>
<td>-0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Business Group</td>
<td>0.45</td>
<td>0.5</td>
<td>0.12*</td>
<td>0.07</td>
<td>0.10*</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>6 Cross-listing</td>
<td>0.02</td>
<td>0.14</td>
<td>0.12*</td>
<td>0.02</td>
<td>0.17*</td>
<td>-0.08</td>
<td>0.08</td>
</tr>
<tr>
<td>7 GDP growth</td>
<td>7.70</td>
<td>2.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Means and standard deviations include the full sample (N=5643). The correlation table is restricted to financial year 2004 (N=820). * p < .01
Table 3.2: Determinants of $\lambda$, Maximum Likelihood Estimates

<table>
<thead>
<tr>
<th>Variable</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \Delta ) in Inventory</td>
<td>0.892</td>
<td>0.975</td>
<td>1.001</td>
<td>0.910</td>
<td>0.940</td>
</tr>
<tr>
<td></td>
<td>(0.126)</td>
<td>(0.271)</td>
<td>(0.270)</td>
<td>(0.268)</td>
<td>(0.267)</td>
</tr>
<tr>
<td>\text{x} GDP growth</td>
<td>0.017</td>
<td>0.016</td>
<td>0.020</td>
<td>0.012</td>
<td>0.017</td>
</tr>
<tr>
<td></td>
<td>(0.019)</td>
<td>(0.019)</td>
<td>(0.019)</td>
<td>(0.018)</td>
<td>(0.018)</td>
</tr>
<tr>
<td>\text{x} Concentration</td>
<td>0.003</td>
<td>0.037***</td>
<td>0.033***</td>
<td>0.040***</td>
<td>0.036***</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.011)</td>
<td>(0.011)</td>
<td>(0.011)</td>
<td>(0.011)</td>
</tr>
<tr>
<td>\text{x} Concentration^2</td>
<td>-0.0004***</td>
<td>-0.0003***</td>
<td>-0.0004***</td>
<td>-0.0003***</td>
<td>-0.0003***</td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td>(0.0001)</td>
</tr>
<tr>
<td>\text{x} Business Group</td>
<td>-0.123*</td>
<td>-0.137*</td>
<td>-0.123*</td>
<td>-0.137*</td>
<td>-0.137*</td>
</tr>
<tr>
<td></td>
<td>(0.075)</td>
<td>(0.073)</td>
<td>(0.075)</td>
<td>(0.073)</td>
<td>(0.073)</td>
</tr>
<tr>
<td>\text{x} Cross-listing</td>
<td></td>
<td>0.067</td>
<td>0.092</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.150)</td>
<td>(0.151)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( N )</td>
<td>5643</td>
<td>5643</td>
<td>5643</td>
<td>5643</td>
<td>5643</td>
</tr>
<tr>
<td>( AIC )</td>
<td>42629</td>
<td>42613</td>
<td>42551</td>
<td>42391</td>
<td>42318</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.667</td>
<td>0.661</td>
<td>0.683</td>
<td>0.664</td>
<td>0.686</td>
</tr>
</tbody>
</table>

Each variable preceded by "\text{x}" is interacted with \textit{Change in Inventory}. Control variables included in the model but not reported include industry-year and state-year fixed effects, industry-year and state-year fixed effects interacted with lagged sales, the main effect of each independent variable listed above, weighted inputs, and the interactions of weighted inputs with the independent variables listed above. Numbers in parentheses are standard errors. The null hypothesis for \textit{Change in Inventory} is that the coefficient is equal to 1. All other coefficients are tested against the null hypothesis that the coefficient is equal to 0.

* \( p < .10 \); ** \( p < .05 \); *** \( p < .01 \)
<table>
<thead>
<tr>
<th>Variable</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>∆ in Inventory</td>
<td>0.8075</td>
<td>0.7935</td>
<td>1.0556</td>
<td>0.7161</td>
<td>0.802</td>
</tr>
<tr>
<td></td>
<td>(0.0986)</td>
<td>(0.2266)</td>
<td>(0.233)</td>
<td>(0.2293)</td>
<td>(0.2293)</td>
</tr>
<tr>
<td>x GDP growth</td>
<td>-0.0004</td>
<td>0.0007</td>
<td>-0.0093</td>
<td>0.0102</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>(0.0157)</td>
<td>(0.0157)</td>
<td>(0.0167)</td>
<td>(0.0157)</td>
<td>(0.0162)</td>
</tr>
<tr>
<td>x Concentration</td>
<td>-0.0036*</td>
<td>-0.0093</td>
<td>-0.0036</td>
<td>-0.0012</td>
<td>-0.0012</td>
</tr>
<tr>
<td></td>
<td>(0.0019)</td>
<td>(0.0088)</td>
<td>(0.0091)</td>
<td>(0.0088)</td>
<td>(0.0088)</td>
</tr>
<tr>
<td>x Concentration²</td>
<td>0.0001</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td>(0.0001)</td>
</tr>
<tr>
<td>x Business Group</td>
<td>-0.2316***</td>
<td>-0.1273*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0745)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x Cross-listing</td>
<td></td>
<td></td>
<td></td>
<td>0.4273***</td>
<td>0.3953***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.0745)</td>
<td>(0.0765)</td>
</tr>
<tr>
<td>N</td>
<td>5643</td>
<td>5643</td>
<td>5643</td>
<td>5643</td>
<td>5643</td>
</tr>
<tr>
<td>AIC</td>
<td>44855</td>
<td>44886</td>
<td>45648</td>
<td>44794</td>
<td>44856</td>
</tr>
<tr>
<td>R²</td>
<td>0.799</td>
<td>0.799</td>
<td>0.810</td>
<td>0.806</td>
<td>0.812</td>
</tr>
</tbody>
</table>

Each variable preceded by “x” is interacted with Change in Inventory. Control variables included in the model but not reported include industry-year and state-year fixed effects, industry-year and state-year fixed effects interacted with lagged sales, the main effect of each independent variable listed above, weighted inputs, and the interactions of weighted inputs with the independent variables listed above. Numbers in parentheses are standard errors. The null hypothesis for Change in Inventory is that the coefficient is equal to 1. All other coefficients are tested against the null hypothesis that the coefficient is equal to 0.

* p < .10; ** p < .05; *** p < .01
Table 3.4: Determinants of $\lambda$, Maximum Likelihood Estimates

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group Affiliated Firms</th>
<th>Non-Group Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Change in Inventory</td>
<td>0.853</td>
<td>0.880</td>
</tr>
<tr>
<td></td>
<td>(0.1881)</td>
<td>(0.4034)</td>
</tr>
<tr>
<td>$x$ GDP growth</td>
<td>-0.004</td>
<td>-0.002</td>
</tr>
<tr>
<td></td>
<td>(0.026)</td>
<td>(0.027)</td>
</tr>
<tr>
<td>$x$ Concentration</td>
<td>-0.005</td>
<td>0.007</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.015)</td>
</tr>
<tr>
<td>$x$ Concentration$^2$</td>
<td>-0.0001</td>
<td>-0.0001</td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0001)</td>
</tr>
<tr>
<td>$x$ Cross-listing</td>
<td>-0.002</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.174)</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>2563</td>
<td>2563</td>
</tr>
<tr>
<td>$AIC$</td>
<td>22574</td>
<td>22570</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.674</td>
<td>0.668</td>
</tr>
</tbody>
</table>

Each variable preceded by “$x$” is interacted with $\text{Change in Inventory}$. Control variables included in the model but not reported include industry-year and state-year fixed effects, industry-year and state-year fixed effects interacted with lagged sales, the main effect of each independent variable listed above, weighted inputs, and the interactions of weighted inputs with the independent variables listed above. Numbers in parentheses are standard errors. The null hypothesis for $\text{Change in Inventory}$ is that the coefficient is equal to 1. All other coefficients are tested against the null hypothesis that the coefficient is equal to 0. * $p < .10$; ** $p < .05$; *** $p < .01$
Table 3.5: Determinants of $\lambda$, Weighted Least Squares Estimates

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group Affiliated Firms</th>
<th>Non-Group Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Change in Inventory</td>
<td>0.685* (0.165)</td>
<td>0.652 (0.357)</td>
</tr>
<tr>
<td>x GDP growth</td>
<td>-0.022 (0.023)</td>
<td>-0.017 (0.024)</td>
</tr>
<tr>
<td>x Concentration</td>
<td>-0.0002 (0.003)</td>
<td>-0.016 (0.013)</td>
</tr>
<tr>
<td>x Concentration$^2$</td>
<td>0.0001 (0.0001)</td>
<td>0.0001 (0.0001)</td>
</tr>
<tr>
<td>x Cross-listing</td>
<td>-0.021 (0.139)</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>2563</td>
<td>2563</td>
</tr>
<tr>
<td>AIC</td>
<td>23146</td>
<td>23146</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.811</td>
<td>0.810</td>
</tr>
</tbody>
</table>

Each variable preceded by “x” is interacted with Change in Inventory. Control variables included in the model but not reported include industry-year and state-year fixed effects, industry-year and state-year fixed effects interacted with lagged sales, the main effect of each independent variable listed above, weighted inputs, and the interactions of weighted inputs with the independent variables listed above. Numbers in parentheses are standard errors. The null hypothesis for Change in Inventory is that the coefficient is equal to 1. All other coefficients are tested against the null hypothesis that the coefficient is equal to 0. * $p < .10$; ** $p < .05$; *** $p < .01$
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Rutgers Business School, 1 Washington Park, Newark, NJ 07102  
Email: matthewgradysmith@gmail.com

Education  
University of Texas at Austin. BA in Spanish Language. 2001

Dissertation  
“Doing It Under The Table”

Summary: The practice of hiding, or under-reporting, sales revenue is a widespread problem in developing economies. This represents an important challenge for policy-makers struggling to raise tax revenue to finance education, healthcare, and infrastructure improvements. In this dissertation, I develop a novel model to examine the firms decision to hide sales using readily available financial data. Applying this model to firms in India’s manufacturing sector, I examine how hidden sales are influenced by the institutional environment and by the firms corporate governance structure.

Dissertation Chair: Dr. Susan Feinberg

Awards and Honors  
Academy of International Business Sheth Dissertation Proposal Award, 2011  
State Farm Companies Doctoral Dissertation Award, 2011  
Finalist, Temple Best Paper Award, Academy of International Business, 2011  
Rutgers University Dissertation Fellowship, 2011

Published Conference Proceedings  
Conference Presentations

Smith, Matthew, 2011. Doing It Under the Table: Hidden Sales in India’s Manufacturing Sector.


Environmental shocks and the timing of market and nonmarket strategies (with S. Feinberg and C. Magelssen)

- Academy of International Business, Nagoya, Japan, June 2011
- Academy of Management, San Antonio, Texas, August 2011

Trade Protection, vertical linkages, and firm strategies (with S. Feinberg and C. Magelssen)

- Academy of International Business, Nagoya, Japan, June 2011

Early adopters and radical regulatory reform in India: First in line for Trade Protection (with S. Feinberg and C. Magelssen),

- Academy of International Business, Rio De Janeiro, Brazil, June 2010
- Academy of Management, Montreal, Quebec, August 2010

Teaching Experience

Business Policy and Strategy (Undergraduate, Rutgers University, Fall 2009, 2010, Spring, 2011)
  Average evaluation - 4.15

Business Policy and Strategy: Teaching Assistant (MBA, Rutgers University, Fall 2008)

Love and Money: Teaching Assistant (Undergraduate, Rutgers University, Spring 2007, 2008, 2009)