Dynastic Management

Francesco Caselli and Nicola Gennaioli*

First Draft: April 2002; This Draft: November 2011

Abstract

The most striking difference in corporate-governance arrangements between rich and poor countries is that the latter rely much more heavily on the dynastic family firm, where ownership *and* control are passed on from one generation to the other. We argue that if the heir to the family firm has no talent for managerial decision making, dynastic management is a failure of meritocracy that reduces a firm's Total Factor Productivity. We present a simple model that studies the macreconomic causes and consequences of dynastic management. In our model, the incidence of dynastic management depends, among other factors, on the imperfections of contractual enforcement. A plausible calibration suggests that, via dynastic management, poor contract enforcement may be a substantial contributor to observed cross-country differences in aggregate Total Factor Productivity.

*LSE, CEPR, and NBER (f.caselli@lse.ac.uk); CREI, UPF and CEPR (ngennaioli@crei.cat). We acknowledge useful comments by Nick Bloom, Max Bruche, Gian Luca Clementi, Luigi Guiso, Berthold Herrendorf, Bart Hobijn, Tim Kehoe, Pete Klenow, Casey Mulligan, Vincenzo Quadrini, Richard Rogerson, Jim Schmitz, Andrei Shleifer, Silvana Tenreyro, John Van Reenen.and anonymous referees. Jas Ellis was the invaluable research assistant. Gennaioli thanks the Spanish Ministerio de Ciencia y Tecnologia (Ramon y Cajal Grant) and the Barcelona GSE Reserach Network for financial support.

1 Introduction

There is broad agreement that differences in aggregate Total Factor Productivity (TFP) constitute a large fraction of the existing cross-country differences in per-capita income. That is, not only do poor countries have fewer productive resources, such as physical and human capital, but they also employ them less effectively than rich countries. The current consensus is that TFP differences account for upwards of 50% of income inequality.[1] Existing attempts to explain this fact emphasize lags in technology diffusion, geography, vested interests and other institutional failures, and several other causes. We believe, however, that a potentially critical source of inefficiency has so far been largely overlooked by the TFP literature: failures of meritocracy.

Individuals are manifestly heterogeneous in their decision-making skills. Differences across countries in the accuracy with which the best decision makers are selected for managerial responsibilities – differences in meritocracy – can result into differences in the returns countries reap from their productive resources – differences in TFP. Meritocracy can fail spectacularly in the public sector [e.g. Caselli and Morelli (2002)]. But meritocracy can also fail in the private sector. This paper studies the macroeconomic causes and consequences of an important private-sector non-meritocratic practice: the inter-generational transmission of managerial responsibilities in family firms, a phenomenon that we call dynastic management.[2]

As we document in Section 2, the incidence of dynastic management is the most striking difference in corporate-governance arrangements between rich and poor countries, as the latter rely much more on the dynastic family firm, where ownership and control are passed on across generations of the same family. We argue that this systematic difference

[1] See Islam (1995), Caselli, Esquivel, and Lefort (1996), Klenow and Rodriguez (1997), Hall and Jones (1999), Parente and Prescott (2000), Hendricks (2002), and Caselli and Coleman (2006). Caselli (2005) presents a survey and assessment of this literature.

[2] Failures of meritocracy are distinct from the problem of "misallocation of talent" emphasized by Murphy, Shleifer, and Vishny (1991). In the latter, talented individuals maximize the private but not the social return on their abilities. In the former, the talented maximize neither the social nor the private return of their skills.

may be a proximate source of TFP differences: even allowing for self selected initiators of family businesses, as long as managerial talent is not perfectly correlated across generations, assets will sooner or later end up "in the wrong hands," i.e. those of a managerially inept descendant. If most firms in an economy are managed dynastically, therefore, aggregate TFP may be negatively affected.

But why is dynastic management more prevalent in some countries than others? In our model we focus on financial frictions. First, financial frictions hinder the working of the market for corporate control, which is a key determinant of the incidence of dynastic management. Untalented heirs of family firms would like to transfer control to new talented owners (or hire talented managers). However, when financial markets are underdeveloped it is difficult for talented outsiders to obtain financing take over incumbent firms. Furthermore, untalented firm owners have little scope for preventing outside managers from appropriating the firm's profits, i.e. it is difficult to separate ownership and control. Additionally, poorly working fiancial markets hinder capital mobility. In principle, talented entrepreneurs could bid up the interest rate and drive untalented managers out of capital markets, but financial frictions dampen this mechanism. Due to both effects, the incidence of dynastic management will be more severe in developing countries precisely because they suffer from less developed financial markets.[3,4]

[3] To be sure, there are many family-owned and -managed firms also in the rich world, where financial markets are reasonably good, and we do not mean to argue that financial frictions are the only cause of dynastic management. In particular, it is likely that members of a family that has historically been associated with a particular firm will derive a sense of identity from continuing in the association (see, e.g., Mann, 1901), and will be more tolerant towards untalented heirs. Another, more benign, view of dynastic management is that it is easier to transmit firm-specific managerial human capital to one's offspring than to outsiders. As we will discuss, the empirical evidence is rather unfavorable to benign views of dynastic management. More to the point, neither "identity" nor firm-specific human capital explain why dynastic management is vastly more prominent in developing countries. Our view is that identity and, perhaps, human-capital issues generate some roughly common non-zero incidence of descendent-operated firms in all countries, but the added mechanism of financial frictions is still needed to give rise to the marked cross-country variation we observe. See Morck and Steier (2005) for further discussions of the historical and political reasons for the ebbs and flows of family capitalism.

[4] Our theory also has implications for the role of rich-country FDI: foreign investors with deep pockets do

We study a growth model where dynastic management arises endogenously as a consequence of financial frictions, and look at the consequences of this failure of meritocracy for TFP, capital accumulation, and other macroeconomic variables. A plausible parametrization of our model is able to generate a cross-country dispersion of TFP which is roughly one third as large as the one observed in the data. Interestingly, both the market for control and capital mobility appear to significantly contribute to the overall effect of financial frictions. Since the model shuts down by construction all of the possible additional sources of TFP differences, this is to be interpreted as the potential explanatory power of financial frictions (through dynastic management) *alone*. The model also generates large differences in capital-labor ratios, equal to roughly three quarters of the observed ones. This is not only because the lack of finance deters lending and therefore investment, but also because talented managers invest more than untalented ones, and in the presence of dynastic management many managers are untalented. Combined, the predicted differences in TFP and in capital-labor ratios yield predicted differences in GDP per worker equal to roughly 70 percent of those in the data.

We also perform some comparative static exercises that highlight the key parameters influencing the quantitative importance of poorly working financial markets, via dynastic management, for TFP differences. For example, we find that a higher degree of heritability of a parent's talent dampens the adverse impact of dynastic management on TFP. Essentially, a high degree of inheritability of talent increases the intra-generational correlation between talent and wealth. Since with credit constraints wealthy individuals invest more, a larger fraction of the capital stock is well managed. We also perform comparative static analyses with respect to: i) the saving rate and ii) the productivity gap between talented and untalented managers. Both factors appear to have an ambiguous impact on TFP.

To sum up, we find that poor financial infrastructure can boost the incidence of dynastic

---

not need to borrow on local financial markets to take control of badly managed companies. This suggests that, if the trend towards globalization continues, dynastic management may become less of a problem even if financial infrastructure remains poor. However, there is another friction that deters FDI: the risk of expropriation by the local government, as recently highlighted by the experience of multinationals that invested in Argentina and in Bolovia during the 1990s.

management (and its sensitivity to other economic factors) by inhibiting the reallocation of existing firms from untalented heirs to talented outsiders in the market for control, and by preventing credit markets from allocating capital to talented entrepreneurs. These two effects increase the share of the capital stock managed by untalented managers and adversely impact TFP. As a result, poorly functioning legal institutions may importantly shape cross country differences in TFP.

This paper contributes to a small theoretical literature on family firms [Bhattacharya and Ravikumar (2001, 2003), Chami (2001), Burkart, Panunzi and Shleifer (2002), and Almeida and Wolfenzon (2006)]. Our work is closest to Burkart, Panunzi and Shleifer (2002), who – like us – view dynastic management as a second-best response to agency problems (stemming in their case from poor shareholder protection).[5] While these works study the microeconomic causes and consequences of family firms, we focus on the macroeconomic causes and effects of this phenomenon.

We also contribute to a large literature on the link between financial frictions and economic development. Lloyd-Ellis and Bernhardt (2000) study how financial underdevelopment shapes the patterns of industrialization and inequality in a model featuring heterogeneity of wealth and of innate ability.[6] Closer to our focus on TFP, Giné and Townsend

[5] In Bhattacharya and Ravikumar (2001, 2003) family firms exploit family-specific business skills. Since the family skill is fixed, the return on capital invested in such firms declines as the firm grows and firms reach a "cashing out" threshold (or a professionalization of management threshold in the 2003 paper). The threshold is higher when financial markets are less developed. Chami (2001) views family firms as principal-agent relationships between parent/owner and child/employee. Trust, altruism, and the prospect of succession mitigate the agency problem relative to the situation where the parent hires outside employees [some of these arguments are also in Mulligan (1997, ch. 13).]. Almeida and Wolfenzon (2005) explain why families use pyramidal ownership structures. Contributions in business and sociology also emphasize the importance of shared cultural values and common beliefs in fostering commitment and long run planning (Gersick 1997, Lansberg 1983, Davis 1983). An excellent recent survey of the literature on family firms is Morck, Wolfenzon,and Yeung (2005).

[6] Other papers studying the wealth-talent-credit interaction include Evans and Jovanovic (1989), who may have been the first to emphasize that credit constraints are especially bad for the talented poor; Kiyotaki (1998) who is interested in the possibility that this mismatch leads to cycles; Ghatak et al. (2002), who in a static model stress the possibility of multiple-equilibria; and Cagetti and De Nardi (2002), who

(2004) and Jeong and Townsend (2004), use the wealth-talent interaction to quantitatively explain time series changes in TFP in Thailand.

Our paper is the first one to quantitatively assess the role of financial frictions in shaping TFP differences across countries. In recent work, Antunes, Cavalcanti, and Villamil (2008), Buera et al. (2010), Amaral and Quintin (2010), and Greenwood et al. (2010) also quantify the impact of financial frictions on TFP in models featuring wealth and talent heterogeneity. In line with our findings, Buera et al. (2010) find that financial frictions can explain around half of the TFP gap between the world' s richest and poorest country. In their model, unlike in ours, individual saving decisions endogenously depend on the level of financial development. On the other hand, their model does not consider the role of the market for control in creating dynastic management, which is one of the most visible forms of capital misallocation in poor countries. A fuller evaluation of the impact of financial frictions on TFP probably requires a joint consideration of endogenous savings and of the market for control.

Our work is also related to recent research emphasizing misallocation of resources among heterogeneous firms/agents (Hsie and Klenow 2009). Independently, Restuccia and Rogerson (2008) analyze a model in which policymakers dish out subsidies that distort the allocation of resources among firms with different productivities. Guner, Ventura, and Yi (2008) study the impact of size-dependent policies.

2 Some Data on Family Firms and Dynastic Management

Our arguments links three well-known facts about developing countries: (i) they have poorly working financial markets, (ii) they have a high incidence of dynastic management, and (iii) they have low levels of TFP. We propose that (i) is one of the reasons for (ii) and that, in turn, (ii) is one of the contributing factors to (iii). To link (ii) to (iii) it is also necessary

try to replicate the US wealth distribution. Also related are the models on intergeneratonal mobility and growth of Galor and Tsiddon (1997), Maoz and Moav (1999), and Hassler and Mora (2000).

that dynastic management is costly at the level of individual firms, which we document below.

Fact (i) is documented in a large and growing literature that goes back at least to Knack and Keefer (1995).[7] The higher incidence of family firms in developing countries is one of the key stylized findings of La Porta et al. (1999), who survey the control structure of publicly listed firms in a sample of 25 countries. They define a firm to be "family held" when a family owns at least 20% of the firm's voting rights. To give few examples, the fraction of the 20 largest public firms that according to this criterion are family held is equal 100% in Mexico, 65% in Argentina, 20% in the U.S. and 0 in the UK. The authors also document that the incidence of family ownership is strongly negatively related to legal protection of investors.[8] Similar findings are reported by Claessens, Djankov, and Lang (2000) in the context of East Asia.[9] The low levels of TFP in developing countries are documented in the literature cited in the Introduction.

Historical evidence is also consistent with the idea that financial development is an important influence on the incidence of dynastic management. Becht and DeLong (2004), Morck et al. (2005), and Aganin and Volpin (2005) show how the deepening and broadening

[7]Other influential examples include Djankov et al. (2003), Rodrik et al. (2004), and Acemoglu at al. (2001).

[8]Simple correlations calculated using the available cross country data, reveal a clear tendency for family capitalism to be less prevalent in countries with better contract enforcement. For instance, by regressing the La Porta et al. (1999) country-level measure of family capitalism (fraction of publicly-quoted firms controlled by a single individual among the 20 largest publicly traded companies in each country in 1995) on the Knack and Keefer (1995) "contract enforcement" index, one finds a significantly negative coefficient. Of course, this regression establishes only a simple correlation, but it shows that in the available cross country data the presence of family firms is indeed negatively related to the quality of the legal system. Moreover, the correlation we found in the data is almost certainly likely to underestimate the true one because the sample is skewed towards high to middle-income countries.

[9]There is also a wealth of easily accessible anecdotal evidence on the incidence of family firms in poor countries. For example, *The Economist* reports that family firms generate 70% of total sales and net profits of the biggest 250 Indian private companies (October 5th, 1996). It is trivial to observe that diffuse ownership and/or outside professional management are virtually non-existent in most Sub-Saharan African countries and most of the poorer Latin American ones.

of stock markets led to periods of relative decline in the hegemony of families in the US, Canada, and Italy, respectively. But historians have also blamed the greater incidence of family firms for the industrial decline of the UK and France relative to Germany and the US in the early Twentieth Century [Landes, (1969), Chandler (1994)], thereby supporting the view that dynastic management may be a source of economic inefficiency.

This last observation brings us to a key building block of our argument, namely that dynastic successions hurt firm performance on average. There is a growing body of evidence that this is indeed the case. Perez-Gonzales (2006) examines a sample of CEO transitions in US family firms. He defines a family firm as one where the retiring CEO is related to the firm's founder, and finds that when the incoming CEO is related to the retiring CEO the firm's performance suffers, relative to the case where incoming and retiring CEOs are unrelated. In particular, returns on assets in the "inherited control" cases fall 20% within two years of the new CEO's tenure, while in unrelated transitions they don't change much on average. He also finds that cases where inherited control is accompanied by declines in performance are largely explained by the poor academic record of the inheriting CEO. This suggests – consistent with the view emphasizing problems of managerial quality – that the efficiency losses are linked to the managerial abilities (or lack thereof) of the heir. Villalonga and Amit (2006) reach very similar conclusions.

Similar findings emerge elsewhere in the world. Bennedsen et al. (2007) compare dynastic and non-dynastic successions in Denmark, with a plausible instrumental variable that overcomes selection issues. They find a substantial decline in the return on assets in dynastic cases. Bertrand et al. (2008) look at 70 of the largest business families in Thailand, and find a deterioration of performance after control passes on from the founder to his descendants, the more so the larger the number of family members involved in management. Bloom and Van Reenen (2010) survey managerial practices in the US, UK, France, and Germany. They find substantial cross-country differences in the quality of management, but about half of these differences disappear when they control for the intensity of product market competition and the greater incidence of family firms managed by descendants of the founder. Morck, Strangeland and Yeung (2000) look at a sample of Canadian firms managed by heirs of the founder and find that they under-perform similar US firms with dispersed ownership. Another piece of evidence consistent with the existence of a cost of bundling management and control comes from Volpin (2002). He examines the determinants of executive turnover and firm valuation for all Italian traded companies from 1986 to 1997, and finds that poor governance – as measured both as a low sensitivity of executives turnover to performance, and as a low Q ratio – is more likely when the controlling shareholders are also top executives.[10]

3 The Model

3.1 Endowments

We study an economy in discrete time. In each period there is a measure-1 continuum of one-period-lived individuals. Their utility function is logarithmic over consumption and bequests (so they have a "warm glow" motive whereby they beqeath a constant fraction of their income, see Section 3.6).

A fraction ω of these individuals are inheritors of firms. We call these individuals "the heirs." Formally, we think of a firm as a license to operate a production technology (to be specified below) and sell the output. Hence, heirs are people who inherit such licenses. These licenses are mostly a convenient modelling device to capture the incumbency status of heirs. Nevertheless, licences to run firms are an accurate description of many developing countries (e.g. the Indian "License Raj"). We will typically use the words "firm" and "licence" interchangeably. The remaining $1 - \omega$ agents born in each period are the "outsiders."[11]

[10] Less direct, but nonetheless relevant evidence comes from Banerjee and Munshi (2002). They show that in the Indian city of Tirupur members of the locally entrenched communal group (analogous to our heirs) operate less efficient firms than non-members (outsiders). Consistent with the view that the persistence of inefficient insiders in business is linked to financial constraints that limit take-overs by outsiders, the average size of the insider-run firms is larger (despite their lower efficiency).

[11] Other models of the wealth-talent-credit interaction typically assume entry barriers in the form of a fixed investment cost. In our model, the incumbency status of firms' inheritors could also be captured by introducing a fixed cost of entry and letting the number of firms ω adjust endogenously. However, in order

Whether or not he inherits a license, each agent i may also begin his life with an endowment of b_i units of the consumption good, which we will refer to as "initial wealth."

Finally, each agent i is endowed with managerial talent θ_i, which can be high, θ_H, or low, θ_L. Some heirs are born talented, some untalented, and the same holds true for the outsiders. λ is the economy-wide fraction of agents of type θ_H. We assume $\omega \leq \lambda$ so that the presence of untalented entrepreneurs does not arise trivially for a lack of a sufficient number of talented managers.

The state of the economy at the beginning of each period can therefore be summarized by the joint distribution of three individual-level characteristics: firm ownership status (does the agent own a licence or not), initial wealth b_i, and talent θ_i. We explain how these variables evolve over time in the next few sections.

3.2 Market for Control

The first set of decisions to occur in any period are buy and sell decisions on the market where outsiders can purchase firms from heirs, which we wil call the market for control. As will be seen below, there are two chief reasons for such exchanges of ownership. First, talented individuals generate a greater surplus from running firms than untalented individuals, so there are gains from trade by transferring control from untalented heirs to talented outsiders. Second, individuals with greater initial wealth can make larger physical-capital investments, so there can also be gains from transferring control from low wealth to high wealth individuals in order to expand the scale of operations.

On the market for control licences are exchanged at price p. For simplicity we assume that each person can own at most one firm - the idea being that of introducing a particularly convenient form of decreasing returns to managerial time. This is similar in spirit to the span of control idea of Lucas (1978). However, unlike in Lucas, in our model there are

to focus on how contract enforcement affects the working of credit markets and of the market for firms (rather than entry) we take the number of licencies as given [a realistic assumption in developing countries, since entry costs are typically very large there (Djankov et al (2003))]. We return to the issue of barriers to entry in the Conclusions.

no diminishing returns to firm size. In Section 6.1 we discuss how our results are likely to change once we relax this assumption.

Given this setup, the demand for firms is the number of outsiders who wish to purchase a license at price p, and the supply is the number of heirs who wish to sell one. We assume that a mechanism leading to market clearing exists, i.e. that in equilibrium p equalizes demand and supply.[12]

One may wonder why is the market for control needed to improve resource allocation on top of capital mobility. For example, absent financial frictions the market for control is irrelevant: given constant returns to scale, full efficiency can be attained by simply relocating the entire capital stock to talented incumbents. Crucially, though, the market for control becomes important precisely in the presence of financial frictions. As financial constraints of talented incumbents become binding, the market for control can improve the allocation of capital by replacing untalented incumbents with talented outsiders. In these cases, consistent with the corporate finance literature (Jensen 1988), the market for control is an essential instument to improve resource allocation.

3.3 Capital Market and Investment

All individuals have access to a storage technology for their initial wealth, whose within-period return is normalized to 1. In other words, inherited amounts of the consumption good can be stored without loss until the end of a person's life.

Alternatively, initial wealth can be transformed into physical capital, for use in the production of new output, as detailed below. The investment technology is linear: one unit of good invested yields one unit of physical capital. We assume for simplicity that all physical capital is entirely consumed in production within a period. This is not unrealistic given the non-overlapping generations demography of our economy. Nevertheless, we performed robustness checks with respect to incomplete depreciation (available upon request) with very modest changes in our key results.

Since initial wealth can be turned into physical capital, there is a role for a capital

[12]Given that licenses are homogeneous, there is no scope for exchanges of licences among heirs.

market where firm owners borrow funds from non-owners and invest them. The interest factor on this market is R. Because the storage technology is accessible to all, we must have $R \geq 1$. The capital market meets just after the closing of the market for firms, and R equalizes desired borrowing with desired lending.

In sum, agents who do not own firms can either store their endowment for the period or lend it to firms at the interest factor R. Firm owners have the same two possibilities (storage, and lending to other owners), as well as investing their own wealth into their own firm.[13]

3.4 Labor Market and Production

The third market to meet is a competitive labor market. Labor supply depends on the number of *active* firms, f, where $f \leq \omega$. The number of active firms may be less than the number of licences as some owners may decide not to operate their firms. We assume that all non-owners, and all owners who leave their firm idle (and whose time is therefore not tied up with managerial responsibilities), inelastically supply their unit labor endowment. Hence, labor supply is $1 - f$. Labor demand is expressed by active firm owners, who take the market-clearing wage w as given.

Next, the economy turns to production. Each firm i combines the capital it installed, K_i and the labor it hired, L_i to produce output according to the production function:

$$Y_i = A_i K_i^{\alpha} L_i^{1-\alpha}.$$

The key assumption is that the efficiency level A_i reflects the ability of the owner: if the owner is talented then $A_i = \theta_H$, if he is not, then $A_i = \theta_L$.

Owners are residual claimants to income net of wage payments, which we (improperly) call "profits," and denote by π_i.[14]

[13] Agents who do not own firms never invest in physical capital because they would then lack a license to operate it.

[14] Implicitly we assume that labor input is homogeneous, i.e. talent only matters for managerial tasks. It would be trivial to extend the model to have two labor types, and doing so should enhance the impact of

3.5 Financial Frictions

At the end of the period, those who borrowed on the capital market owe funds to lenders. Furthermore, some of the purchases of firms may also have been externally financed. Thus, debtors must now decide whether or not to repay their debts. We assume that courts in this economy have the ability of seizing a fraction ϕ of the resources of a party in violation of contractual commitments, such as a debtor who fails to repay the creditor in full. The debtor keeps the remaining share $(1 - \phi)$ of resources (so there is no deadweight loss from imperfect enforcement). If $\phi = 1$, then enforcement is perfect. Default decisions will clearly depend on ϕ, which is therefore our key parameter describing the efficiency of financial markets.

3.6 Inter-Generational Dynamics and Objective Functions

We introduce two sources of inter-temporal linkages. The first is a bequest motive, and the second is a mechanism for the inter-generational transmission of abilities. One could say that the first regulates the inter-temporal transmission of physical capital, and the latter of human capital.

Each agent engages in asexual reproduction of one offspring, who will live next period. If an agent owns a firm, he bequeaths the licence to the offspring. Whether or not an agent owns a firm, he also bequeaths to his offspring a fraction γ of any wealth he owns at the end of his life (and consumes the rest). Hence, our bequest behavior is akin to a constant saving rate *á la* Solow (1956). Finally, the offspring of an untalented agent is untalented with probability η_L, and the offspring of a talented agent is talented with probability η_H. Each agent's objective is to maximize current income. Because of computational constraints our behavioral assumptions are necessarily simplistic, but we believe that more sophisticated consumption-bequest decisions would not significantly affect our results. See Buera et al (2010) for an analysis of a model with forward looking savings decisions but without a

dynastic management on TFP. Intuitively, having two labor types implies a lower wage for the untalented, and hence less of an incentive for untalented heirs to sell their firms. We expect this effect to be small.

market for corporate control.

3.7 Market for Managers

In Appendix A.1 we further extend this model to a situation where – as an alternative to selling the firm – untalented firm owners can transfer control by hiring a talented manager. In that extension we generalize the intepretation of ϕ as the overall ability of courts to enforce contracts, and not just debt contracts. With this interpretation, we show that this extension does not change our results. The reason is that manager-owner relationships are also generally more or less viable, depending on the quality of an economy's contract-enforcement infrastructure. Countries where the courts have a difficult time enforcing debt contracts, will also have a difficult time providing managers with the incentives not to steal a firm's profits – if not its assets – from the owner-principal. Hence, when one solution (transfer of ownership) is unfeasible, so is the other (hiring a manager).

3.8 Timeline

The model setup and timing can be summarized by the following timeline:

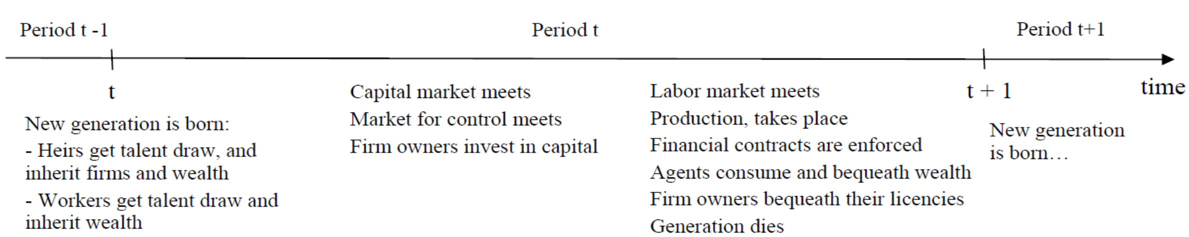

Figure 1: *Timeline*

4 Equilibrium Analysis

A stationary equilibrium in this economy is composed of: an invariant distribution $F(b, \theta, z)$ where b is an agent's inherited wealth, θ is his managerial talent and z is an indicator variable equal to 1 if the agent is born with a licence and 0 otherwise; optimal decisions by each individual - as a function of his (b, θ, z) - as to whether: i) buy or sell a firm, ii) borrow, lend or store consumption within the period, iii) invest capital in his own firm, iv) supply labour, v) consume or beqeath end of period income; and prices (p, R, w) such that: the markets for firms, for borrowing and lending, and for labour, clear. Of course, borrowing decisions are subject to financial constraints, which must also be satisfied in equilibrium.

In this section, we highlight the key behavioral and equilibrium relationships of our model. The model is best analyzed by backward revisiting the various stages of economic life laid out above, starting with the labor market and production.

4.1 Output, Wages and Profits

Since agents maximize income, firm owners seek to maximize profits, which are given by $A_i K_i^a L_i^{1-\alpha} - wL_i$, taking the wage w as given. Aggregating over all firms' demand functions labor demand turns out to be

$$L^d = \left(\frac{1-\alpha}{w}\right)^{\frac{1}{\alpha}} \left[(1-s)\theta_L^{\frac{1}{\alpha}} + s\theta_H^{\frac{1}{\alpha}}\right] K,$$

where K is the aggregate capital stock ($K = \int_i K_i di$), and s is the fraction of the aggregate capital stock in firms run by talented managers [$s = \int_{i;A_i=\theta_H} (K_i/K) di$]. We will sometimes refer to s as an index of "meritocracy." Clearly, the term $(1-s)\theta_L^{\frac{1}{\alpha}} + s\theta_H^{\frac{1}{\alpha}}$ is a measure of the average efficiency in the economy.

Setting labor demand equal to labor supply $1-f$, we can solve for the equilibrium wage:

$$w = (1-\alpha)\left(\frac{K}{1-f}\right)^{\alpha} \left[(1-s)\theta_L^{\frac{1}{\alpha}} + s\theta_H^{\frac{1}{\alpha}}\right]^{\alpha}. \tag{1}$$

Intuitively, the wage depends on the aggregate capital-labor ratio, $K/(1-f)$, and on the way the capital stock is distributed between talented and non-talented owners: the greater s, the greater the overall efficiency of the economy, the higher workers' wages.

Plugging the firm's labor demand and the wage functions in the expression for the firm's output, and aggregating across firms, we obtain aggregate GDP per worker:

$$\frac{Y}{1-f} = \left(\frac{K}{1-f}\right)^{\alpha} \left[(1-s)\theta_L^{\frac{1}{\alpha}} + s\theta_H^{\frac{1}{\alpha}}\right]^{\alpha}, \tag{2}$$

where $Y = \int_i Y_i di$. This illustrates the nice aggregation properties of the model: despite the existence of arbitrary heterogeneity in the firm distribution of capital and efficiency, aggregate output can be decomposed into the contributions of capital intensity, $K/(1-f)$, and a "TFP" term, $\left[(1-s)\theta_L^{\frac{1}{\alpha}} + s\theta_H^{\frac{1}{\alpha}}\right]^{\alpha}$. This will be useful when assessing the quantitative predictions of the model against cross-country evidence on TFP differences. Even more importantly, the meritocracy index s entirely determines TFP, and is therefore the endogenous variable of greatest interest in this paper.

Firm i's profits $Y_i - wL_i$ are given by

$$\alpha \frac{A_i^{\frac{1}{\alpha}}}{\left[(1-s)\theta_L^{\frac{1}{\alpha}} + s\theta_H^{\frac{1}{\alpha}}\right]^{1-\alpha} \left(\frac{K}{1-f}\right)^{1-\alpha}} K_i \equiv \pi\left(A_i\right) K_i. \tag{3}$$

Profits increase linearly in firm's size, K_i. The gross return on capital, $\pi(A_i)$, is increasing in managerial talent A_i, and decreasing in meritocracy s and the aggregate capital stock K. The latter two effects are mediated by the wage: the larger K and s, the higher the wage, the lower the profits left over for firm owners' to collect. Intuitively, individual owners prefer to compete against untalented rivals.

4.2 Borrowing, Lending, and Investment

Borrowing, lending, and investment take place after the meeting of the market for firms, so the ownership status of agents is known. Consider then the situation of an outsider i, with talent A_i and initial wealth b_i, who has acquired a licence at price p. If he operates a firm of size K_i his life-time income is

$$\pi(A_i)K_i - R[K_i - (b_i - p)]. \tag{4}$$

In words, he earns profits $\pi(A_i)K_i$, out of which he repays any debts. Since his net worth is $(b_i - p)$, his indebtedness is $[K_i - (b_i - p)]$.[15] If one sets $p = 0$, then (4) represents the

[15] If $K_i < b_i - p$ the agent is a lender, and the second term in the income equation is interest income.

income of a heir who did not sell his licence.

The income equation shows that the owner's choice of physical capital will typically feature a corner solution: if $\pi(A_i) > R$ the owner borrows as much as he can, while if $\pi(A_i) < R$ he does not operate the firm and lends his net worth on the capital markets (or store it, if $R = 1$). Only if $\pi(A_i) = R$ he is indifferent about the amount he borrows.

Consider then the case $\pi(A_i) \geq R$. How much is the owner allowed to borrow? This depends on the borrower's incentive to default. If the borrower defaults, his income is $(1-\phi)\pi(A_i)K_i$: default allows the debtor to avoid debt-service charges, but incurs him a proportional cost ϕ associated with foreclosure. Incentive compatibility requires that this quantity is no larger than the quantity in (4), which is the borrower's income if he does not default. Comparing the two expressions we see that incentive compatibility is not binding if $R \leq \phi\pi(A_i)$. We rule out this case below. If instead $R > \phi\pi(A_i)$, the maximum scale of operations the owner can reach is:

$$K(A_i, b_i) = \frac{R(b_i - p)}{R - \phi\pi(A_i)}. \tag{5}$$

The function $K(.)$ represents an owner's "capital capacity." Capital capacity increases more than one-to-one with the owner's initial wealth, as b_i also operates as a basis for leverage. The larger the initial wealth of the owner, the more he stands to lose from defaulting, the more he can borrow from others - a well known property of models with imperfect credit markets. Capital capacity is also larger for talented owners: since they earn larger profits, they have more to lose from defaulting. The macroeconomic variables that adversely affect capital capacity are R, because an increase in R increases the amount of debt to be serviced and thus the incentive to default; p, which reduces the borrower's net worth, and with it his capacity to borrow; and K and s, which lower profits and hence the cost of default. Notice that, ceteris paribus, the dependence on p implies that heirs are able to borrow more than buyers of firms.[16]

[16] A more accurate statement of an owner's capital capacity is

$$K(A_i, b) = \max\left[\frac{R(b_i - p)}{R - \phi\pi(A_i; K, s)}, 0\right].$$

To see why capital capacity is zero when $b_i < p$ notice that a borrower with none of his own wealth invested

Substituting for K_i in (4) and rearranging we get that the life-time income of an owner who decides to run his company is

$$\frac{R(1-\phi)\pi(A_i)}{R-\phi\pi(A_i)}(b_i-p). \tag{6}$$

The next question we must address is whether an owner will indeed choose to operate his firm. An alternative strategy would be to let the firm idle (i.e. forego using the licence), lend his net worth, and join the labor market. We already know that, if $\pi(A_i) < R$, the owner always chooses this path. But he could also choose it if it provided life-time income greater than the life-time income associated with running the firm. His life-time income from not running the firm is $w + (b_i - p)R$. Comparing this with (6) we see that an owner operates his firm if and only if

$$w \leq \frac{\pi(A_i)-R}{R-\phi\pi(A_i)}R(b_i-p). \tag{7}$$

Hence, wealthier and more talented owners are more likely to operate their firms. Also, more owners will choose to operate their firms if the wage (i.e. K and s) and the interest factor are low.

Given the foregoing observations, we can now introduce some general-equilibrium considerations. First, there are no equilibria where $\pi(\theta_H) \leq R$. For, in this case, no owners would wish to operate their firms [as $\pi(\theta_H) \leq R$ implies $\pi(\theta_L) < R$], and the aggregate capital stock would be zero. But $\pi(\theta_H)$ - the gross return on capital - goes to infinity as K goes to zero, leading to a contradiction. Second, in equilibrium $R > \phi\pi(\theta_H)$; otherwise, firm owners have an infinite borrowing capacity and, given $\pi(\theta_H) > R$, demand for capital would also go to infinity. This triggers an upward adjustment in R. Note that since $\phi\pi(\theta_H) < R$ then also $\phi\pi(\theta_L) < R$.

We can summarize this discussion as follows. In equilibrium, talented firm owners whose net worth exceeds the one implicitly defined in (7) operate their firms. Their scale

would surely default, as $R > \phi\pi(A_i)$. But only individuals with positive net worth $b_i - p$ can invest some of their own wealth. The reason why the statement in the text is accurate is that individuals such that $b_i < p$ never buy firms, so this case never arises. Individuals with $b_i < p$ never buy firms precisely because their capital capacity is zero, so they have nothing to gain from doing so.

of operations is given by their capital capacity $K(\theta_H, b_i)$. Low net worth talented owners leave the firm idle, earn R on their wealth, and sell their services on the labor market. If $\pi(\theta_L) < R$ all untalented firm owners shut down their firm, lend or store their wealth, and join the labor force. If $\pi(\theta_L) > R$ untalented firm owners behave as talented ones: those with sufficient net worth operate their firm at maximum capacity, while the others leave the firm idle, lend or store their wealth, and earn wage income. The total demand for funds on the capital market is the sum of the capital capacities of all the owners who decide to operate their firms. If this aggregate capital capacity is less than the aggregate net worth, then the equilibrium features $R = 1$, and lenders are indifferent between lending and storing. (For, if the interest factor was greater than 1, lenders would compete to lend, driving the interest factor down.)[17]

4.3 Market for Control

We can finally step back to the most interesting market in this economy, where firms' ownership is determined. On the supply side of this market, each heir i decides whether to keep or sell his firm. If he keeps the firm and subsequently operates it, his income is given by (6) (with $p = 0$). If instead he sells his license, his income is $w + (b_i + p)R$. Comparing these two options, and rearranging, the set of heirs i who wish to sell their license is given by:

$$w \geq \frac{\pi(A_i) - R}{R - \phi\pi(A_i)} Rb_i - Rp. \tag{8}$$

Hence, higher R, p, K, and s increase the supply of firms. Also, less talented and poorer heirs are more likely to sell.[18]

[17] In other words, the supply of capital is a step function, equal to 0 for $R < 1$, equal to the aggregate net worth of the economy for $R > 1$, and equal to anything in between for $R = 1$. The demand for capital is the total capital capacity of active entrpreneurs, and is downward sloping.

[18] Condition (8) is derived assuming that heirs compare their payoff from selling with their payoff from keeping *and using* the license. It is clear that all those who would not use the license should they remain in possession of it, will try to sell it irrespective of the price p. Hence, a subset of the sellers is identified by condition (7). However, condition (8) is less stringent than condition (7), so it completely describes the set of sellers.

On the demand side there are talented and untalented outsiders. An outsider i will compare (6) (his income if he buys) with $w + Rb_i$. Hence, buyers are identified by the condition:

$$w \leq \frac{\pi(A_i) - R}{R - \phi\pi(A_i)} Rb_i - \frac{R(1-\phi)\pi(A_i)}{R - \phi\pi(A_i)} p. \tag{9}$$

Higher K, s, R, and p reduce the demand for firms. Furthermore, more talented and richer outsiders are more likely to be seeking to purchase firms.

Conditions (8) and (9) embody a number of important properties of the model. First, the conditions under which an outsider wishes to buy a license are more stringent than the conditions under which a heir wishes to keep the firm. In other words, the average buyer is richer and more talented than the average keeper.[19] This is because outsiders have to pay price p in order to buy their firm. Second, exchange of firms may happen for two reasons. (i) Untalented heirs may transfer control to talented outsiders who maximize the firm's productivity. (ii) Poor insiders may sell their firms to rich outsiders who expand the scale of operations. Third, and most important, when $\pi(A_i) > R$ better enforcement (a higher ϕ) increases the value of running a firm, reducing firm owners' incentive to sell, and increasing outsiders' incentive to buy. Yet, equations (8) and (9) imply that this effect is asymmetric for talented and untalented people. Ceteris paribus, a higher ϕ renders talented heirs relatively less willing to sell and talented outsiders relatively more willing to buy. Thus, absent wealth heterogeneity, improvements in ϕ lead to greater meritocracy. However, if agents start their lives with different wealth levels, better financial markets may allow untalented but rich agents to leverage their wealth to such an extent that they are more willing to own firms than talented agents. It is the correlation between wealth and talent that determines the impact of financial development on meritocracy.

We conclude this section with general equilibrium observations that are useful in solving the model. If the price p is positive then there can be no idle firms: their owners would sell them. Conversely if there are idle firms, i.e. heirs who wish to sell but were not able to find a buyer, then it must be the case that $p = 0$.[20]

[19] Notice that in the relevant case $\pi > R \geq 1$ the quantity multiplying Rp in (9) is greater than 1.

[20] This discussion has not taken into account the possibility that the buyer defaults on the purchase price

4.4 Solving for Equilibrium

The search for an equilibrium in any given period proceeds as follows. We start with a proposed set of equilibrium values for p, R, f, s, and K. Given f, s, and K we compute w from (1), and $\pi(\theta_H)$ and $\pi(\theta_L)$ from (3). With these values, as well as with p and R, we use (8) to classify all heirs into keepers and sellers. The sum of the sellers is the supply of firms. We use (9) to identify all outsiders who wish to buy a firm, which gives the demand for firms. If the supply of firms exceeds the demand (a situation that can be an equilibrium only when the price p is 0), the unsold firms are idle, and involuntary keepers are drawn randomly from the population of aspiring sellers. This generates f', or the number of active firms implied by the proposed set of solution values. Also, given the new ownership structure determined on the market for firms, the demand for capital K' is the sum of the capital capacities of all the owners, (5), and the implied level of meritocracy s' is the fraction of this that accrues to talented owners. We have found an equilibrium if $f' = f$, $K' = K$, and $s' = s$.

Once we find an equilibrium, we calculate firm ownership-status and the end-of-period wealth of all the agents. We then use our assumptions on the intergenerational transmission of wealth and talent to determine the next period's initial distribution of wealth, ownership status, and ability.

We do not have generic proofs of existence and uniqueness of the equilibrium, but in our simulations we have encountered no instances where an equilibrium did not exist. Also, our simulations attempt to find all possible equilibria. Again we have encountered no instances of multiplicity, even though equilibrium multiplicity is a theoretical possibility in this model (see Caselli and Gennaioli (2005) for a formal analysis).

---

p. The reason why there is no incentive compatibility constraint is that, as we argued in footnote 16, and is also implied by (9), only outsiders i such that $b_i > p$ buy firms. Hence, there is no loss in generality in assuming that all purchases of licences are financed by direct out of hand payments from buyer to seller.

5 Calibration

The parameters required to simulate the model are α (production function), θ_H/θ_L (relative TFP of well run firms), ω (number of licences per person), λ (percent of agents who could make a good manager), η_L and η_H (probability of inheriting one's parent talent), γ (generosity of bequest, or saving rate), and of course our key enforcement parameter ϕ. Our goal is to assess the quantitative importance of variation in ϕ. Hence, we proceed as follows. First, we identify the empirically relevant range of variation for ϕ. Then, we choose all other parameters so that the model is consistent with US macro- or micro-economic statistics. Finally, holding all these other parameters constant, we look at predicted values of TFP, and other outcomes, in countries with lower ϕ. The idea of course is to isolate the effect of financial development on efficiency in economies that are otherwise identical.

Identifying the empirically relevant range of variation for ϕ is relatively straightforward. In the US, and perhaps in a few other rich economies, financial contract enforcement simply works. As a result, most viable (positive NPV) projects are financed and implemented.[21] A piece of evidence on the value of ϕ in rich countries is provided by Franks and Torous (1994), who find that deviations from absolute priority in favor of equity holders in distressed exchanges and Chapter 11 reorganizations (a concept akin to $1-\phi$ in our model) are well below 10 percent on average. To be conservative, we set the US value of ϕ to 0.9. In practice, it turns out that for most macroeconomic outcomes the quantitative predictions of the model become insensitive to the particular value of ϕ for $\phi \geq 0.5$, so the choice of ϕ at the high end is not particularly critical. At the other end of the financial development spectrum, there are obviously many countries whose judicial system is so inefficient and corrupt that debt contract enforcement is virtually non-existent. Hence, we argue that the empirically relevant lower bound for ϕ is around 0. This assumption is substantiated by the evidence in Djankov et al. (2008), who construct a measure of the cost- and time-efficiency of bankruptcy procedures across countries. They find that in developing countries, even without accounting for managerial stealing or other contractual violations, bankruptcy

[21] For example, Hurst and Lusardi (2004) find that in the U.S. entry in entrepreneurship is independent of initial wealth. This result is clearly at odds with a severe credit constraint on entrepreneurs.

dissipates almost all of the value of a financially distressed firm (about 99% in Angola and 90% in Venezuela).[22]

For the parameters α and γ it is fairly easy to identify plausible values (or intervals). The production function parameter α is the share of capital *and entrepreneurial effort* in income. It thus includes all of capital income plus the share of labor income that accrues to the top management. Cooley and Prescott (1995) set the capital share at 0.4. It is hard to pin down the managerial share of labor income exactly, so we add ten percent and set $\alpha = 0.5$. For the bequest parameter γ we chose a benchmark of 0.3, which is an historically plausible figure for the saving rate. Needless to say, we will present extensive robustness checks to these and the other parameter choices.

For the number of licenses ω we use the strategy of matching moments from the model to moments from the data. In particular, we choose ω so that, conditional on all other parameter choices, the model's steady state number of *active* firms per person f equals 0.04, which is the number of firms in the US as a percent of the labor force according to the US Census' web site.

Next we turn to the inheritance parameters η_H and η_L. We choose these two numbers so as to match two statistics that are (somewhat) easier to think about. The first is the intergenerational correlation of managerial talent, q. The second is the fraction of managerially-talented individuals, λ. In the appendix we show how, in order to replicate an intergenerational correlation of talent, q, while at the same time maintaining a constant share λ of talented individuals in the population, η_H and η_L must be, respectively

$$\eta_L = 1 - \lambda + \lambda q \tag{10}$$

$$\eta_H = \lambda + q - \lambda q. \tag{11}$$

The question is now one of choosing q and λ. For q, we use estimates of the intergenerational correlation of IQ. We do not mean to suggest that managerial talent is synonymous with IQ, but we think it is plausible to assume that IQ and managerial talent follow similar

[22] In contrast, in rich countries such as the U.S. and Singapore the time and legal costs of bankruptcy dissipate only around 7% and 4% of the firm's value.

rules of intergenerational inheritance. In the Appendix we review the psychological literature on the persistence of IQ, based on which we set our benchmark value for q at 0.40.[23] This choice clearly abstracts from (at least) two powerful intuitions about the inheritance patterns of managerial talent. On the one hand, one may expect that heirs will absorb firm-specific human capital by interacting with their parents. This suggests a larger value of q than the one for IQ. On the other, heirs of family firms are often deemed to suffer from the "Carnegie effect," according to which inherited wealth "deadens the talents and energies of the son, and tempts him to lead a less useful and worthy life than he otherwise would."[24] This suggests a lower value of q for entrepreneurs. The reader will no doubt have these effects in mind when we present our robustness checks to alternative values of q.

Turning now to λ, or the share of the population that can successfully run a business, we cannot rely on "off the shelves" estimates, because managerial talent is hard to measure. In addition, for economies with good financial markets, our model's predictions for the key observable macroeconomic aggregates are independent of λ. Indeed, to anticipate one of the key bresults below, for $\phi \geq 0.5$ all firms are run by talented managers (at least as long as $\lambda \geq \omega$). As a result, we cannot calibrate λ to match some U.S. benchmark. However, we reason as follows. In an economy with low entry barriers like the U.S. [Djankov et al. (2003)], talented managers are unlikely to be prevented from using their talents by entry regulations (which would potentially be the case if $\lambda > \omega$), nor they are prevented (by financial frictions) from employing the country's capital stock. As a result, it is realistic to assume that in the benchmark frictionless economy the number of available licencies is not smaller than the number of people who could productively run a firm. This condition, together with our assumption $\lambda \geq \omega$, implies that $\lambda = \omega$. We thus set $\lambda = \omega$ in our benchmark calibration. Later, we show that our simulations are robust to alternative values of λ.

For θ_H/θ_L we rely on Perez-Gonzales' (2006) estimate that dynastic successions in the

[23] Interestingly, a similar figure is obtained by Solon (1992) and Zimmerman (1992) as an estimate of the intergenerational correlation of income.

[24] Bill gates has expressed similar concerns, and a large number of American billionaires have publicly opposed President Bush's plan to eliminate estate taxation on similar grounds.

US lead to an average decline in the return on assets of 20 percent. We use this number by reasoning as follows. First, to anticipate one of our results below, under virtually any combination of parameters a country with $\phi = 0.9$ – which we argued is the case for the US – will have only talented owners, or $s = 1$. This implies that all successions are from a high level of talent in the previous generation. Next, we imagine that the offsprings of the previous CEO "try out" as CEOs for a few years. This is the stage when they are observed by Perez-Gonzales, who picks up the lack of talent among some of them. Subsequently, those who under-perform transfer control to someone talented (but not before their underperfomance provides us with the information needed to calibrate θ_H/θ_L). Given these assumptions, the average change in the return on assets after a dynastic succession is $(1-\eta_H)[1-\pi(\theta_L)/\pi(\theta_H)]$, or the percentage $(1-\eta_H)$ of untalented heirs times the drop in performance associated with the fall in talent. Using (3) and the Perez-Gonzales estimate this boils down to

$$\frac{\theta_L}{\theta_H} = \left(1 - \frac{0.2}{1-\eta_H}\right)^{\alpha}.$$

The set of benchmark values resulting from this calibration strategy is reported in Table 1.

α	θ_H/θ_L	ω	η_h	η_l	γ
0.5	1.33	0.10	0.46	0.94	0.3

Table 1: Data and Implied Estimates of MPK and $PMPK$

We simulate the dynamic evolution of an economy populated by 5000 individuals. We randomly generate a period-0 distribution of initial wealth across them using a uniform distribution on the $[0, 0.25]$ interval. We randomly assign a talent (low or high) and an ownership status (yes or not) to the first generation of agents. Both initial talent and ownership status are drawn from binomial distributions with parameters λ and ω, respectively. Given these initial conditions, we observe the evolution of the economy for our benchmark calibration, for a variety of values of the enforcement parameter ϕ. For each value of ϕ we let the economy evolve over 30 periods (generations), though in practice all of the endogenous variables seem to settle down to "steady state" values after 5 periods or so. We report such steady state values for the endogenous variables as averages over periods 10 to 30.

6 Results

6.1 Benchmark Parameter Values

Our benchmark results are depicted in Figure 2. The endogenous variable of greatest interest in this paper is TFP, i.e. the quantity $\left[(1-s)\theta_L^{\frac{1}{\alpha}} + s\theta_H^{\frac{1}{\alpha}}\right]^{\alpha}$. The steady state value of TFP is plotted in panel (a) against 10 possible values of ϕ between 0 and 0.9 – the empirically relevant range as discussed in the previous section. TFP is (weakly) upward sloping, indicating that improvements in financial development lead to improvements in governance. The relationship levels off for $\phi = 0.5$, because at this value and above it becomes possible for all inept owners to sell their firms.

Quantitatively, the effect of ϕ is large: the economy with the poorest enforcement has TFP levels as low as 79 percent of the TFP of the most efficient economy. Hence, we conclude that the model can account for a 21 percent TFP gap between the most efficient and the most inefficient economy, *due to dynastic management alone*. In a 93-country data set for the year 1996, the 10th percentile of the TFP distribution is computed to be about 30% of the 90th percentile [Caselli, 2005]. Hence, the fraction of the observed TFP gaps potentially explained by the model is $21/70 = 0.3$. Since we have shut down all other possible sources of TFP differences we regard this as a large effect.

In our model there are two mechanisms through which improved financial infrastructure reduces the inefficiencies caused by dynastic management. First, on the market for control, more untalented heirs sell their licenses to talented outsiders. Second, on the capital market, talented managers can expand their operations through borrowing relatively more than untalented ones. Both mechanisms result in an increase in the relative amount of capital in the hands of talented individuals. To gauge the relative importance of these two mechanisms we have simulated an alternative version of the model where there is no market for control:

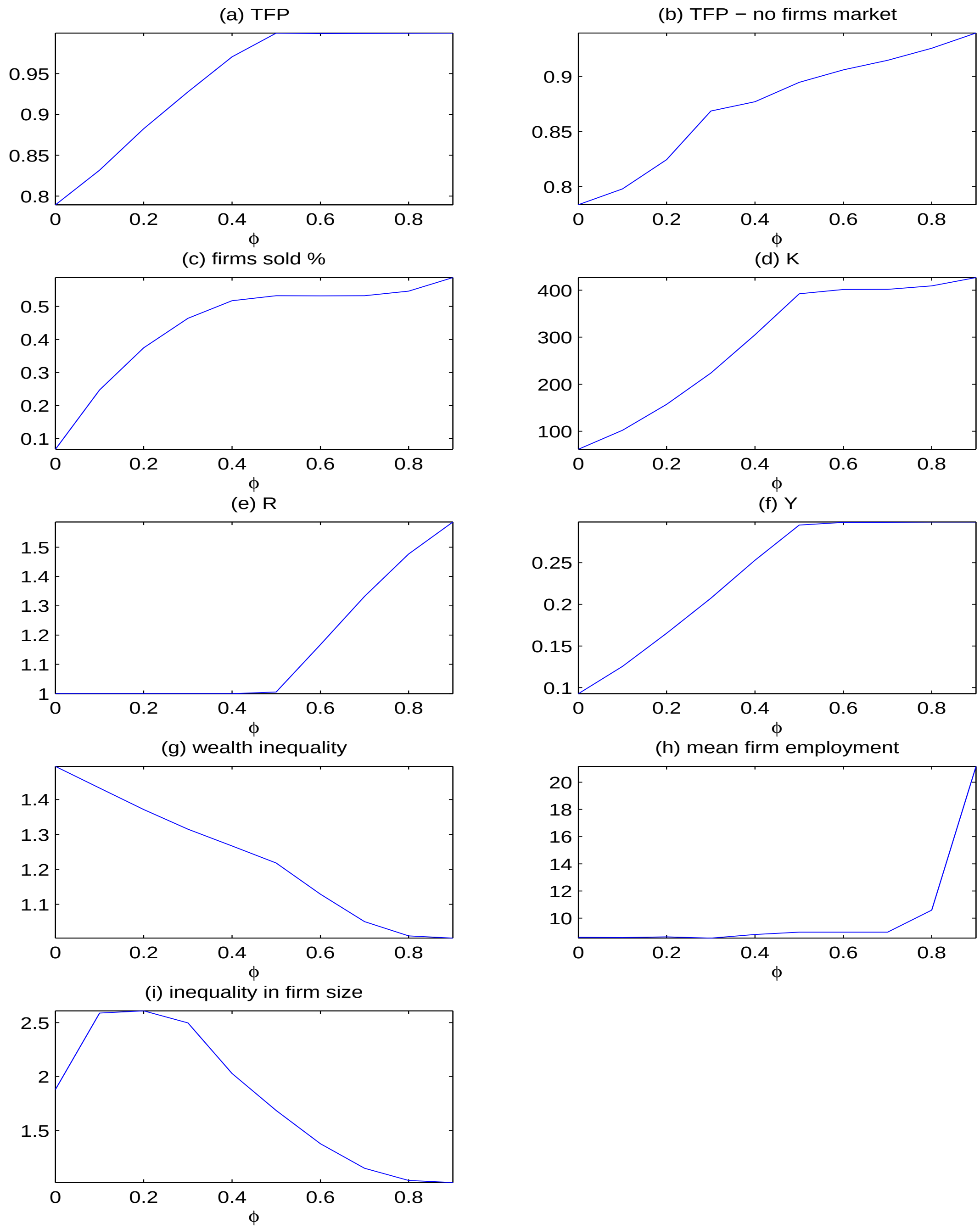

Figure 2: *Benchmark Results*

licenses always stay with the initial owner. The steady state TFP level of this economy is plotted in Panel (b). It seems clear that the market for control is at least as important as the capital market in determining the long-run aggregate efficiency of the economy: even with almost perfectly efficient capital markets (or $\phi = 0.8$), in the absence of a market for control TFP is only 85 percent of what it would be with a market for control. Thus, the market for control plays a quantitatively important role in reducing the costs of dynastic management.

The market for control would probably play an even larger role in a pure "span of control" world with decreasing returns to firm size. In such a world, capital mobility can only exert a limited impact on productive efficiency because the ability of talented entrepreneurs to expand their scale of operation is limited. As a result, the presence of some badly run firms would probably result into larger aggregate losses relative to our current setup. Or, differently put, improvements in aggregate TFP would rely to a larger extent on the ability of the market for control to replace untalented owners with talented ones.[25]

The role of finance in facilitating transfers of control is further underscored by Panel (c), which plots the fraction of active firms that change owner in an average period in steady state, always against ϕ. Here we observe a steep rise in the fraction of firms changing hands as ϕ increases. When we looked at the identity of buyers and sellers we found that all buyers were talented and all sellers untalented, so all sales are motivated by differences in talent, as opposed to differences in wealth.

In the remaining panels of Figure 2 we document the implications of our model for a variety of additional macroeconomic variables of interest. In line with standard predictions from growth models under imperfect credit markets, the amount of capital in use in firms, K, is strictly increasing in financial development, and the quantitative impact of ϕ on capital accumulation is large [Panel (d)]: the lowest-highest gap is about 75% of the $10_{th}-90_{th}$ percentile gap in the data. While credit constraints would tend to reduce capital accumulation in any growth model, in the current version their adverse effect is boosted by the heterogeneity in talent. We quantify the extra effect of talent heterogeneity in subsection

[25] Bloom et al. (2011) find large differences in the quality of management among Indian textile firms, and argue that the reason why the well managed ones do not expand at the expense of the others is due to owning family facing span of control constraints.

6.4 below. Panel (e) shows the interest factor, R. For low values of ϕ the aggregate "capital capacity" of firms in this economy is small, as potential lenders are weary of default. Hence, only a fraction of the overall liquid wealth with which every period begins is transformed into physical capital and the interest-factor is anchored to the rate of return on the storage technology ($R = 1$). For ϕ large enough, however, the capital capacity of firms becomes sufficiently strong to absorb the entire liquid wealth, and competition for finance drives up the interest rate ($R > 1$). Hence, as in other models of financial imperfections, interest rates are not necessarily higher in countries with a high physical marginal product of capital.[26] Coming back to Panel (d), this reasoning also explains the kink in the profile of K against ϕ.[27]

Bringing together our predictions on TFP and the capital stock, Panel (f) shows that per capita GDP, the measure of welfare in our economy, increases monotonically in ϕ. The quantitative impact of financial development, which combines the separate effects of ϕ on TFP and investment, is large, as the country with the worst financial infrastructure has about 0.3 of the per capita GDP of the country with the best contract enforcement. The 90_{th}-10_{th} interpercentile ratio in the data is 0.05, suggesting that by merging dynastic management with factor accumulation effects allows credit frictions to explain about 0.7/0.95=73 percent of the observed per capita income gap.

In Panel (g) we plot steady state wealth inequality – as measured by the ratio of mean to median end-of-period liquid wealth b_i – implied by the model for different values of ϕ. Consistent with empirical evidence the relationship is negative (better financial markets imply less inequality). In financially underdeveloped (i.e. low ϕ) countries, owners enjoy large rents and wages are low, while with financial development rents decline and wages

[26] Caselli and Feyrer (2007) present evidence on the divergence between physical marginal products and financial rates of return across countries.

[27] Castro, Clementi, and McDonald (2004) find that better investor protection may *reduce* capital accumulation by lowering the income of the (young) entrepreneurs, who have to give a larger share of profits to the (old) investors. In our model it is also true that a higher ϕ maps into higher interest rates, with a potentially negative effect on the demand for capital. However, in our model the benefit of relaxing the incentive compatibility constraint with a higher ϕ dominates the Castro et al. effect.

grow.[28] Also consistent with empirical evidence is that richer countries have larger average firm size in terms of workers (or, equivalently, the number of firms per capita is declining in ϕ), as shown in Panel (h).[29] Finally, as depicted in Panel (i), inequality in firm sizes is inverted-U shaped in ϕ: countries with intermediate values of financial development exhibit the biggest spread between the mean and the median firm. Indeed, when ϕ is very low borrowing is limited and firms' dispersion is bounded by the distribution of initial wealth; when ϕ is large wealth does not matter for investment and talented managers run equally sized firms. When ϕ is intermediate, financial development is not good enough to induce all untalented heirs to sell but it still allows firm owners to leverage their wealth and expand the scale of operation. In this range credit markets magnify the differences between the size of the firms owned by rich/poor and/or talented/untalented agents, leading to the inverted-U shaped relationship between firm size dispersion and aggregate TFP.[30]

6.2 Effects of Inheritability of Talent

In Figure 3 we begin probing the robustness of our results to deviations from our benchmark calibration, starting with the most interesting case in the context of dynastic management, i.e. the talent-inheritance parameter, q. Figure 3, as all subsequent figures, reproduces the same information as Figure 2, but adds results for various deviations from the benchmark calibration. Hence, for example, in Panel (a) we look at TFP as a function of ϕ for 5 possible values of q: 0 (corresponding to i.i.d. talent draws), 0.4 (our benchmark), 0.6, 0.8, and 1 (corresponding to perfect intergenerational transmission of talent).

Our simulations show that a high degree of heritability of talent pushes the economy towards greater efficiency: for any level of ϕ, steady state TFP is (weakly) larger at higher

[28] See Cagetti and De Nardi (2002) for another model were better enforcement leads to less inequality.

[29] This is the main focus of Quintin (2008).

[30] Also inverted-U-shaped is the relationship between the market price of firms and ϕ (not plotted for reasons of space). A larger ϕ increases the demand for firms by increasing the ability of talented outsiders to buy, but it also favors the concentration of the existing capital in the hands of talented heirs, thus inducing untalented ones to sell. This last effect increases the supply of firms and dominates the first one when ϕ is large enough.

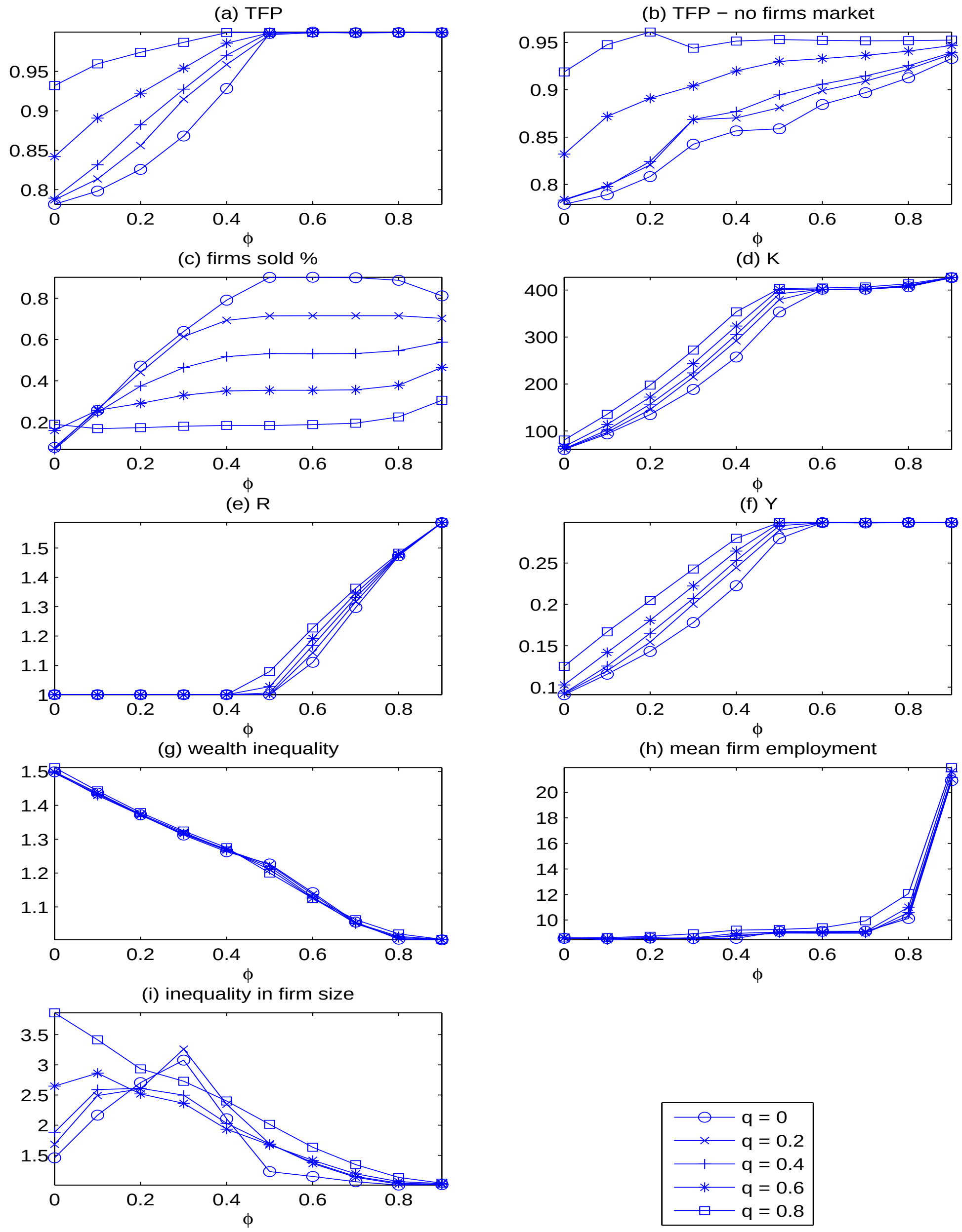

Figure 3: *Variation in the Inheritance of Talent*

values of q. The mechanism that makes dynastic management less of a problem with high talent inheritability is simple. In every period talented managers make higher profits and bequeath larger assets. A high intergenerational correlation of talent increases likelihood that their offsprings are talented as well, thereby increasing the correlation between talent, wealth, and firm ownership. This high positive correlation between talent, wealth, and ownership implies that the markets for control and for capital play less critical a role in efficiently allocating ownership and assets. In Panel (c) we show that reallocation of ownership does indeed decline as q increases.[31]

6.3 Effects of the Saving Rate

We next consider the effects of variation in the saving/bequest rate γ (Figure 4). Because γ governs the dynamics of the wealth distribution, and because the wealth distribution affects the outcome in the market for firms, it is possible that γ will exert a direct causal impact on TFP. On the market for control, there are two opposing effects at play. On the one hand, a higher γ increases the size of the bequests received by talented outsiders, thus facilitating their purchases of firms. On the other hand, a higher γ increases the persistence of liquid wealth across dynastic lines, thus making more likely that rich but untalented heirs hold on to managerial responsibilities. Panel (c) shows that these effects lead to some nonmonotonicity in the relationship between γ and the amount of ownership changes, though quantitatively the net effect is modest.

On the market for capital, the saving rate affects the allocation of capital towards talented agents, and hence TFP, mainly through a general equilibrium effect mediated by the interest rate. A lower saving rate implies a dimished supply of capital [Panel (d)] and hence a higher interest rate [Panel (e)]. A higher interest rate hurts untalented agents because the talented ones can afford to pay a higher interest rate, so it tends to reallocate

[31] The nonmonotonicity in the graph for TFP for $q = 0.5$ is due to a numerical aberration: for $\phi = 0.6$ there happens to be a dynasty that accumulates a disproportionate amount of wealth [see panel (h)], and this dynasty happens to have several untalented draws, which means that a significant amount of capital remains badly managed. This effect would disappear if the number of agents grew asymptotically. Another nonmonotonicity is documented in Panel (j): when the inheritance of talent is sufficiently high inequality in firm size is monotonically decreasing in ϕ.

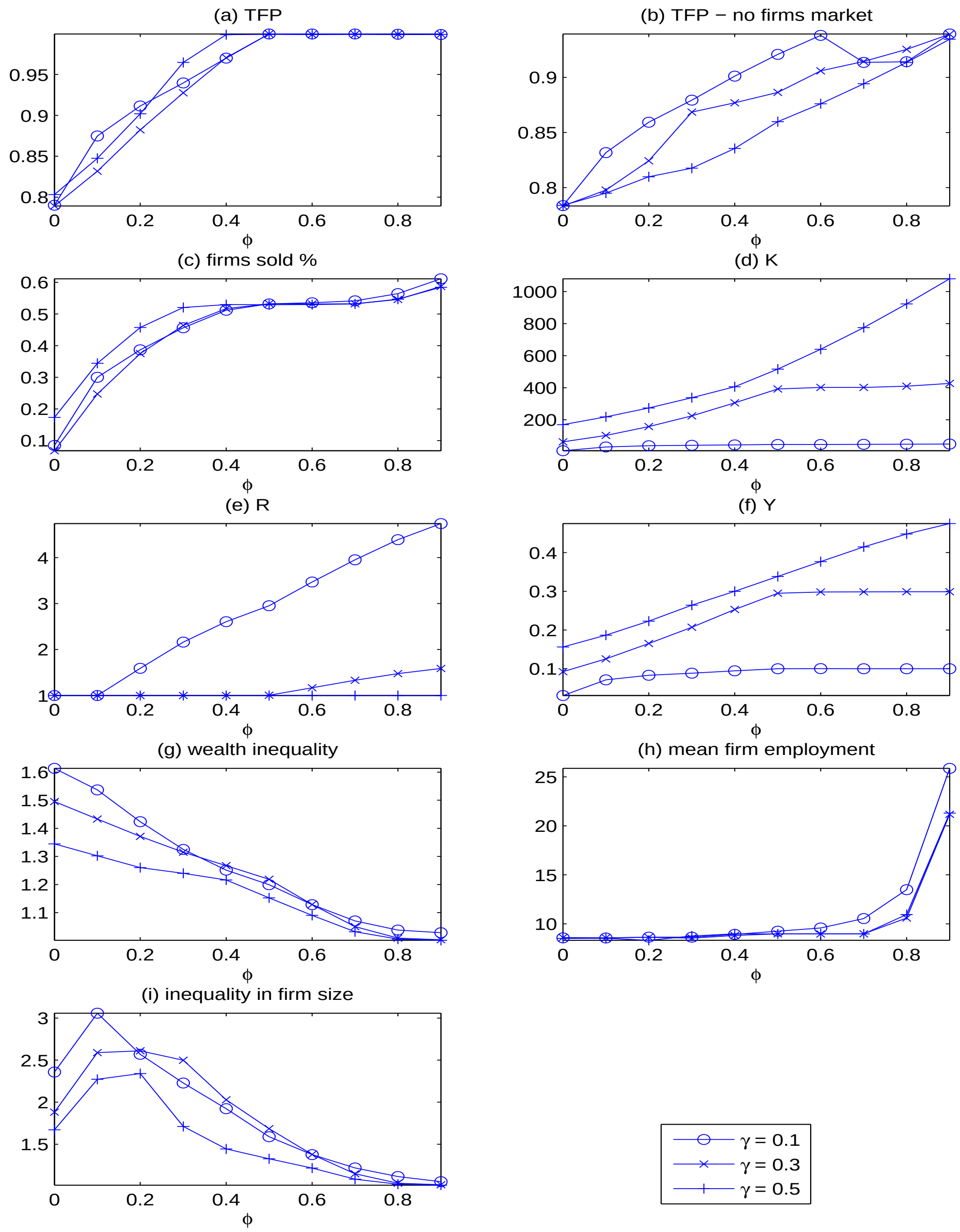

Figure 4: *Variation in Saving Rate*

capital towards the latter. Also, the smaller the saving rate, the smaller the impact on a dynasty's current investment of incomes it earned far in the past. Thus, dynasties that were untalented one period ago (and are thus very likely to be untalented today as well), are going to invest very little in the current period. These effects determine why in an economy without a market for control TFP tends to decline monotonically with the saving rate [Panel (b)]. When all these effects are taken into account, the overall effect of the saving rate on TFP is nonmonotonic but pretty small [Panel (a)].

6.4 Effects of Relative Ability

Another interesting nonmonotonicity arises in connection with the relative ability θ_H/θ_L. We consider five cases: 1, 1.15, 1.3 (our benchmark), 1.45 and 1.6. In Panel (a) of Figure 5 we see that at low levels of ϕ a greater efficiency gap between talented and untalented managers leads to larger losses in aggregate TFP. This reflects the loss in efficiency of those firms that are badly run. But another effect of an increase in θ_H/θ_L is that the gains from trade between the talented and the untalented increase, leading to greater firm reallocation [as also seen in Panel (c)]. Hence, a greater ability gap also means that fewer firms are in untalented hands. The figure shows that this second effect becomes dominant for larger values of ϕ. Another result of interest in this figure is Panel (d), where we can gauge the additional role of heterogeneity in talent in depressing capital accumulation over and above more standard models of credit constraints with homogeneous ability. We see that dynastic management ($\theta_H/\theta_L > 1$) has an additional non-trivial effect.

Finally, notice that dynastic management ($\theta_H/\theta_L > 1$) is also key to generating the inverted U shaped relationship between firm sizes and financial development [see Panel (i)]. Heterogeneity in bequests exerts only a small effect in the distribution of firms' sizes. The intutition is that the process of capital accumulation tends to reduce the impact of bequests' inequality on firms' sizes in the long run.

6.5 Variation in α, ω, and λ, and Summing Up

Robustness to alternative values of the (augmented) labor share parameter α and the number of talented individuals in the population is explored in Figures 6, 7, and 8, respectively.

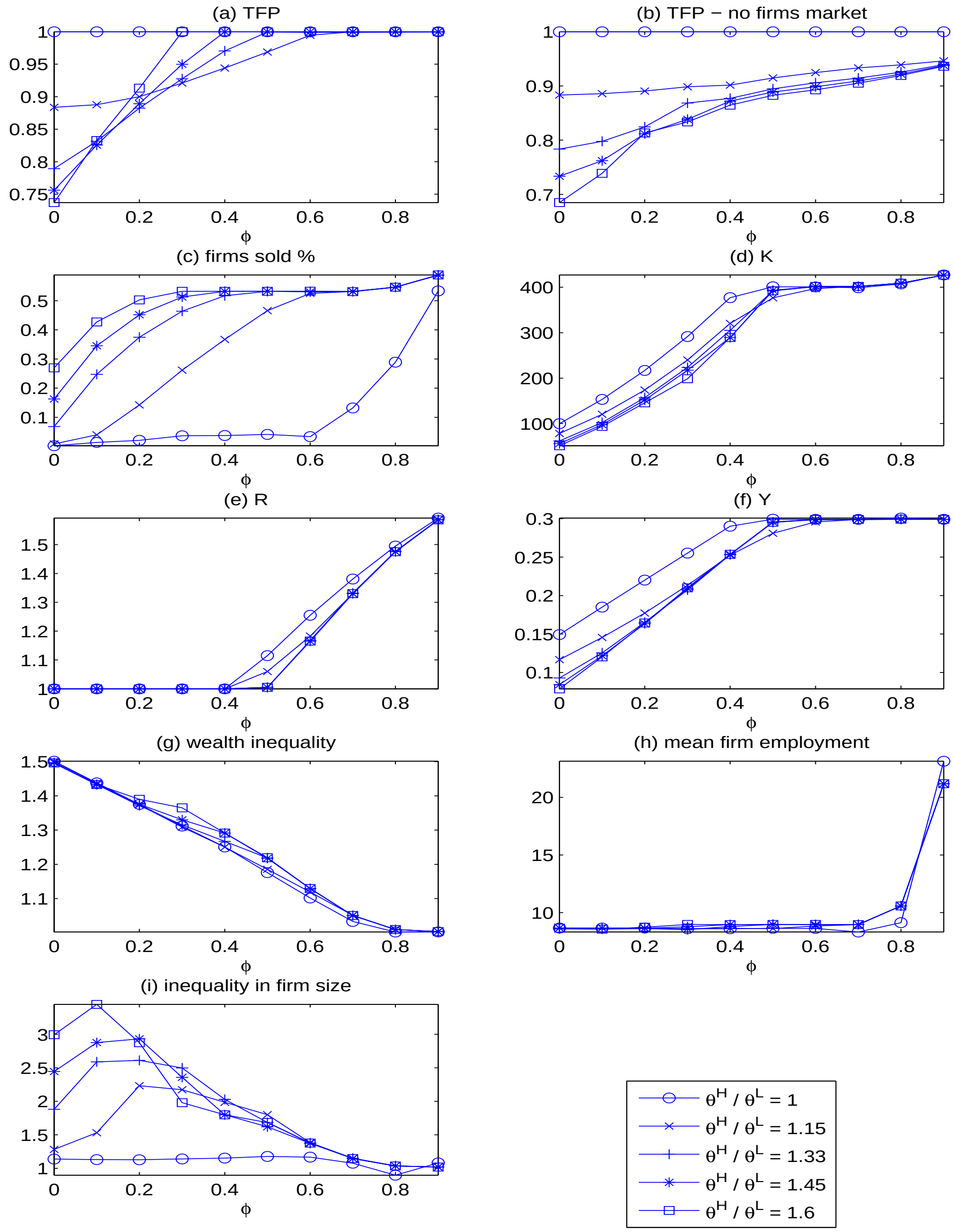

Figure 5: *Variation in Relative Ability*

The overall message from these figures, as well as from all the previous ones, is that the exact quantitative impact of dynastic management on TFP, capital accumulation, and output depends on the specific values of the model's parameters one uses. Nevertheless, in the vast majority of the plausible parameter space the effects are quantitatively substantial and indicate that through dynastic management, poor financial development may be an important contributor to the observed differences in aggregate TFP across countries.

7 Conclusions

This paper has argued that one of the adverse consequences of poorly functioning financial markets is a failure of meritocracy: untalented heirs of productive assets – rather than talented individuals not born to wealth – carry critical decision-making responsibilities. We present a growth model where poor enforcement of financial contracts leads to dynastic management, i.e. untalented heirs own and manage family firms. Poorly working financial markets cause this productive inefficiency by: i) stifling the working of the market for corporate control, and by ii) hindering capital mobility across firms. A plausible calibration of our model shows that, due to both of these channels, the aggregate efficiency costs of poor contract enforcement may be severe, and explain as much as 50 percent of cross-country differences in TFP. Our calibration also shows that financial frictions shape capital accumulation, per capita income, wealth inequality, and the size distribution of firms.

The link between financial frictions, capital misallocation, TFP and family firms has been recently taken up by several papers. We discussed in the introduction the macro literature quantifying, via model calibration, the link between financial frictions and TFP. But also direct evidence has been produced. Bloom and Van Reenen (2008) document that family ownership can explain a significant part of cross country differences in the productivity of firms. If these analyses document the costs of dynastic management, a question arises as to why don't countries pursue policies that reduce the incidence of this non-meritocratic practice. Recent work has started to tackle this question. Acemoglu (2008) builds a model of oligarchic societies where dynastic control of firms emerges as the way for an elite to secure its political and economic supremacy. Caselli and Gennaioli (2009) study the political economy of two reforms aimed at reducing the incidence of dynastic

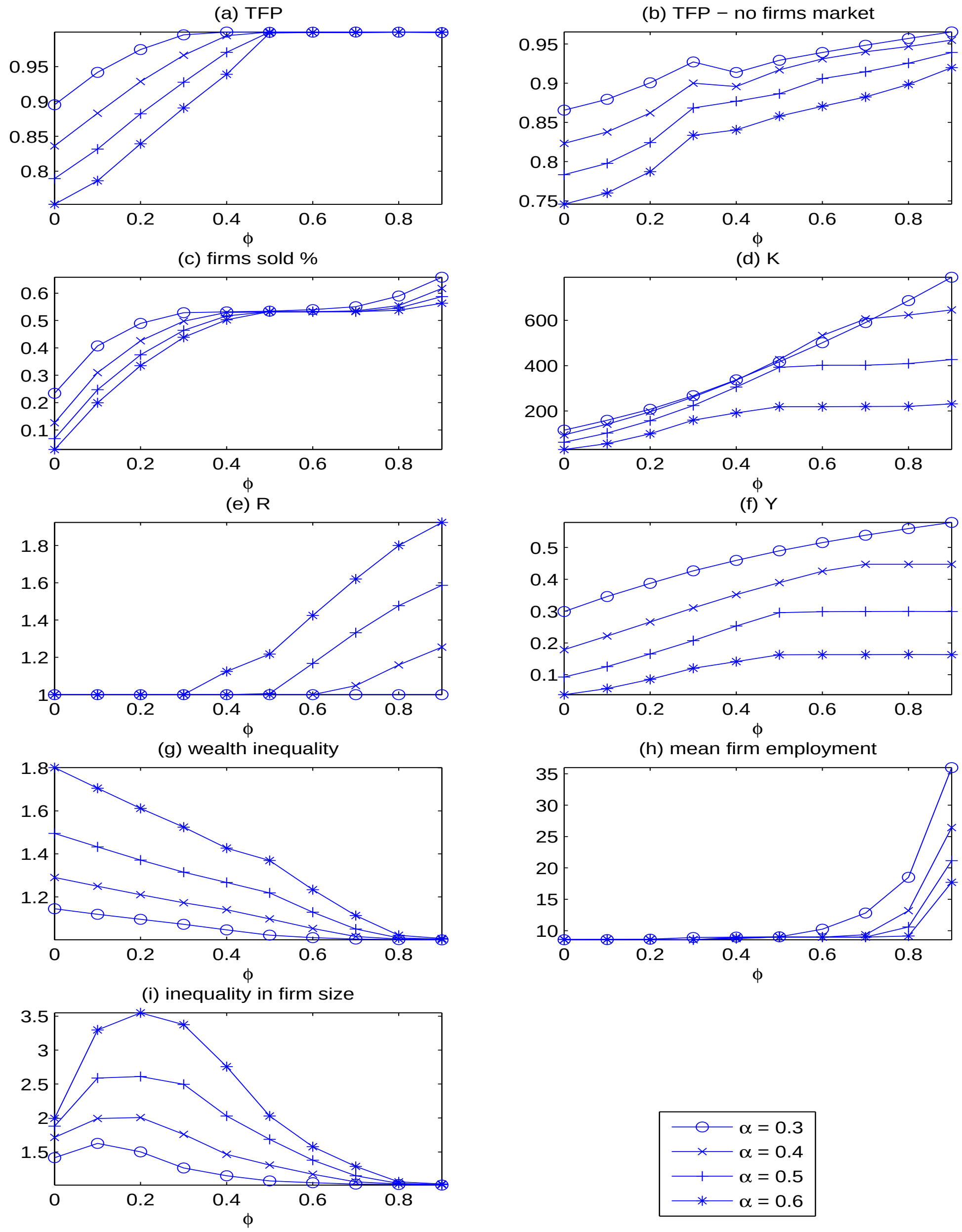

Figure 6: *Variation in Owner Share*

management, financial reform and deregulation, and show that the market for control plays a key role in shaping their political feasibility.

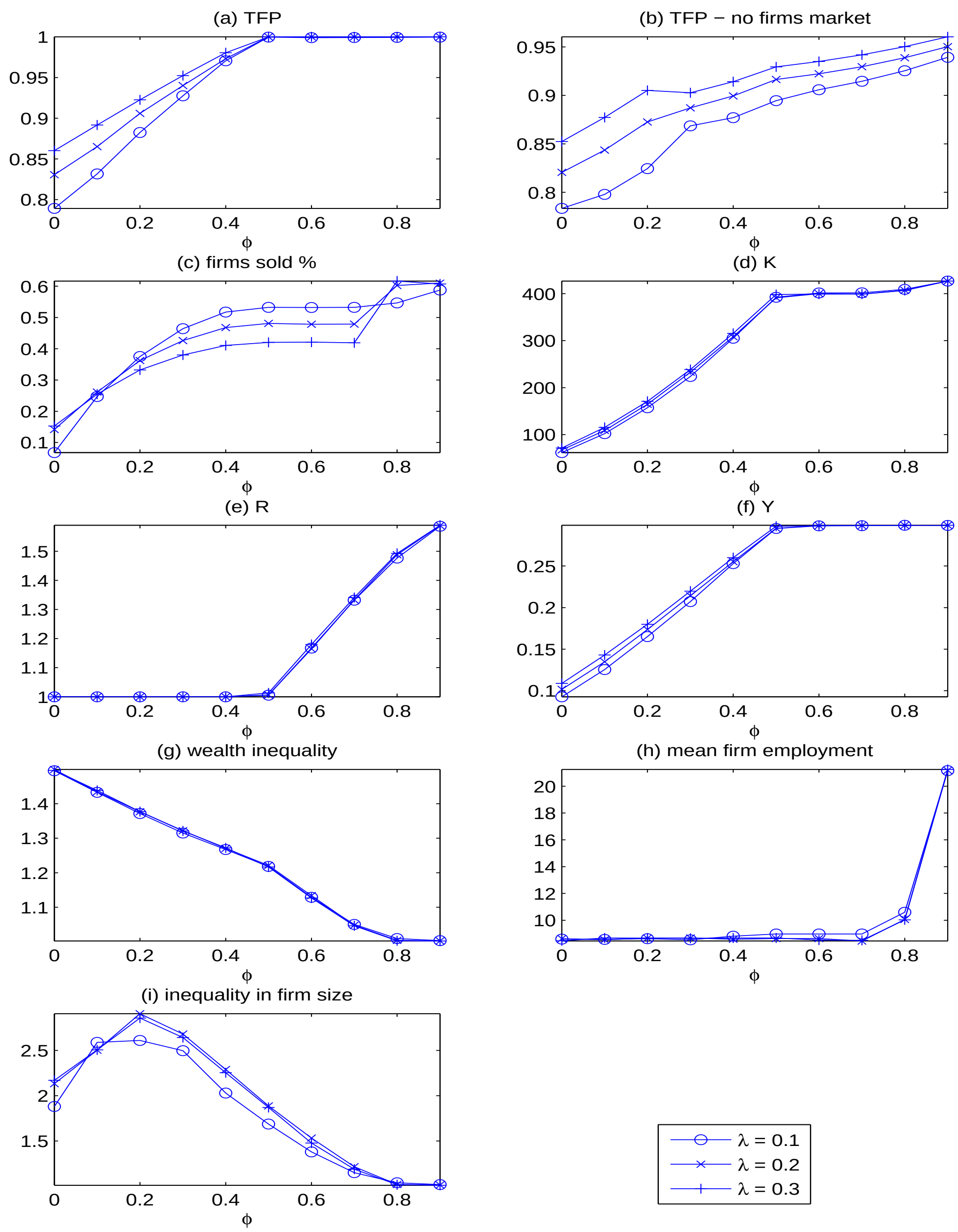

Figure 7: *Variation in Supply of Talent*

Much remains to be done to understand the causes and consequences of dynastic management in the real world. While the current perspective emphasizes cross-country differences

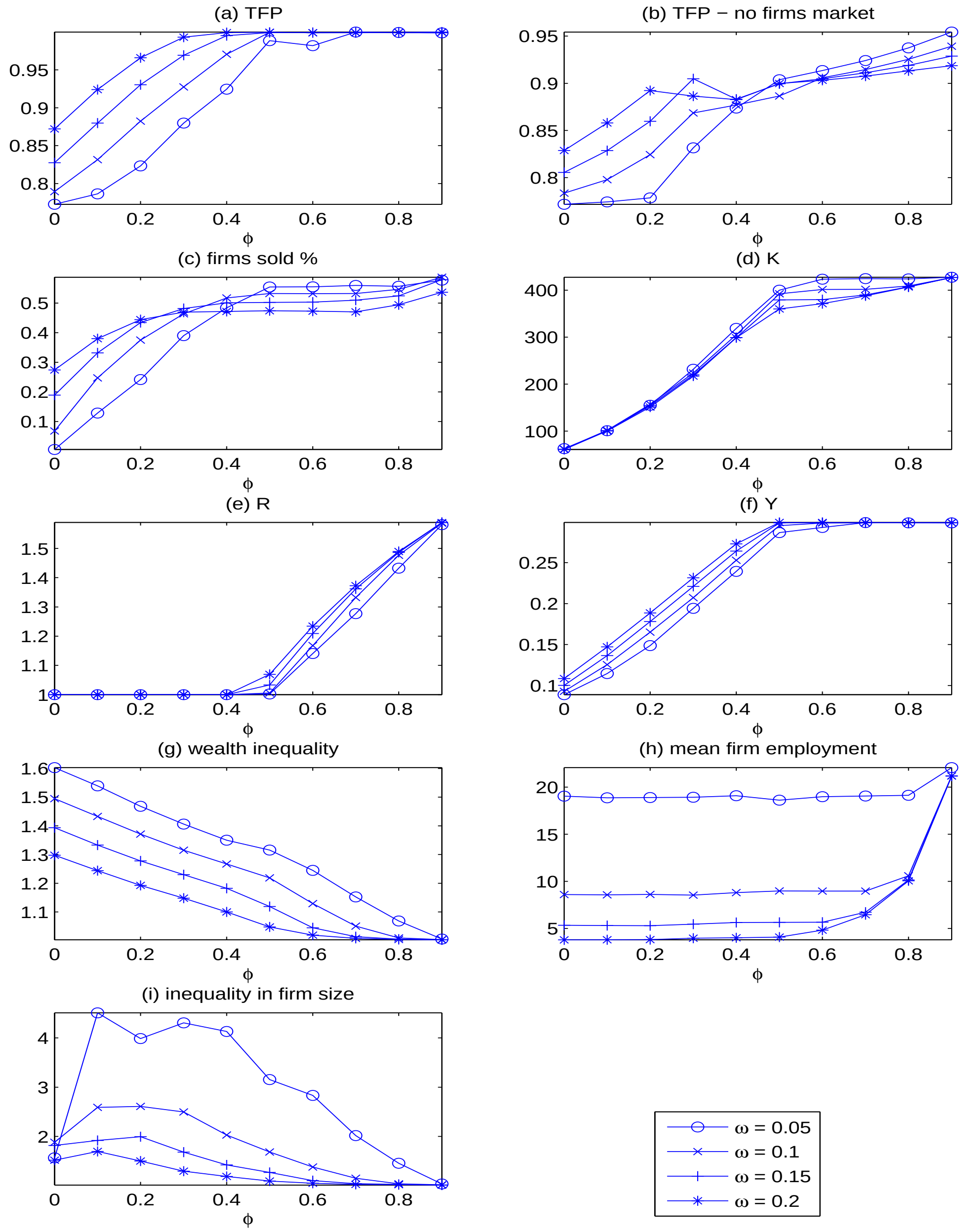

Figure 8: *Variation in Number of Licenses*

in financial development, there are other important institutional variables that may also contribute to differences in meritocracy. To name but a few, regulatory barriers to entry, estate taxation, cultural traits, and inheritance laws are all worth of attention in future work.[32] Our paper has some preliminary results on the role of barriers to entry: an increase in the available number of licenses ω reduces the price of firms, facilitating the working of the market for control. Of course a proper modelling of this mechanism is beyond the scope of this paper, but the results in Figure 8 suggest that combining cross-country differences in financial development with cross-country differences in barriers to entry may enhance the explanatory power of dynastic management for TFP differences. We plan to investigate this issue in future work.

A Appendices

A.1 Opening a Market for Managers

In this appendix we open up a market where untalented owners of firms may hire talented workers to run operations as managers. We show that the existence of this market does not affect the equilibrium of the economy, because it cannot solve the basic contracting problems that plague economies with $\phi < 1$. We consider the family of contracts in which if agent i becomes a manager, he receives an amount t_i from the owner ex-ante (i.e. before running the firm), and promises to return to the owner a dividend $m_i \geq 0$ after production is carried out (recall that there is no uncertainty so m_i is known). The managerial contract must provide the manager with the incentive to repay both shareholders and creditors. Again if the manager defaults on his obligations the courts will seize a fraction ϕ of what he diverted. Suppose that agent i is endowed with wealth b_i. Then, it must be that:

$$\pi(A_i)K_i - m_i - R[K_i - (b_i + t_i)] \geq (1 - \phi)\pi(A_i)K_i. \tag{12}$$

The left hand side of (12) represents what the manager obtains if he repays, namely profits minus dividends minus repayments to creditors. The right hand side represents what he obtains if he defaults on creditors and shareholders. Notice that if the firm is worth running

[32] Ellul et al. (2010) show that inheritance laws have an important impact on the investment policies undertaken by family firms.

the manager also always invests his own wealth $b_i + t_i$. Conditional on the terms of the managerial contract m_i and t_i equation (12) describes manager i's "capital capacity."

Turning now to the participation constraints, we have that the heir must be at least indifferent as to hire a manager or sell the firm. In other words, we must have $m_i - Rt_i \geq Rp$. On the other hand, the manager must be at least as well off as when buying a license on the market for control. His life time income if he buys a license is given by equation (4). Comparing this to the left-hand-side of (12) we see that the manager participates only if $m_i - Rt_i \leq Rp$. Thus, the only case in which the market for managers can operate in equilibrium is when $m_i + Rt_i = Rp$. But then 12 implies that talented outsiders are indifferent between being managers or buying firms, and untalented owners are indifferent between hiring managers or selling their firms. Hence, in equilibrium, the exact same level of meritocracy prevails whether the market for managers exists or not, or in other words the market for managers performs no allocative function over and above the one performed by the market for control.

A.2 Calibration of η_H, η_L

Bouchard and McGue (1981) survey the genetic research on IQ. Their paper is a summary of 111 studies on familial resemblances in measured intelligence. They argue that the pattern of average correlations in IQ scores is consistent with a polygenic theory of inheritance, which says that the higher the proportion of genes two people have in common, the higher the average correlation between their IQ. In particular, they estimate that the average correlation of Parent-Offspring IQ scores is 0.42.

We calibrate the stochastic process for the intergenerational transmission of talent by assuming that the IQ score of a person is one to one related to his ability θ. In particular, under the assumed stochastic process for talent, the steady state fraction of talented people in the population is λ whenever

$$\lambda(1 - \eta_H) = (1 - \lambda)(1 - \eta_L) \tag{13}$$

The average score, therefore, is $EIQ = \lambda\theta_H + (1-\lambda)\theta_L$, and the variance is

$$VIQ = \lambda(\theta_H - EIQ)^2 + (1-\lambda)(\theta_L - EIQ)^2 = \lambda(1-\lambda)(\theta_H - \theta_L)^2.$$

Furthermore, the parents-children covariance can be computed as follows:

$$\begin{aligned} CIQ &= \lambda\eta_H(\theta_H - EIQ)^2 + [\lambda(1-\eta_H) + (1-\lambda)(1-\eta_L)]\,(\theta_H - EIQ)(\theta_L - EIQ) + \\ &\quad +(1-\lambda)\eta_L(\theta_L - EIQ)^2 \\ &= (\eta_H + \eta_L - 1)\lambda(1-\lambda)(\theta_H - \theta_L)^2 \end{aligned}$$

Thus, the correlation coefficient of parents' talent with children talent, q, is $CIQ/VIQ = \eta_H + \eta_L - 1 = q$. Together with (13), this last condition implies the calibration conditions (10) and (11).

References

Acemoglu, D., Johnson, S, and Robinson, J. A. (2001), "The Colonial Origins of Comparative Development: An Empirical Investigation", *American Economic Review*, 91(5), pp. 1369-1401.

Acemoglu, D. (2008): "Oligarchic versus Democratic Societies", Journal of the European Economic Association, 6(1), pp. 1-44.

Aganin, A., and Volpin, P. (2005): "The History of Corporate Ownership in Italy", in Morck, R. (ed.), *The History of Corporate Governance around the World: Family Business Groups to Professional Managers*, University of Chicago Press.

Almeida, H.V., and Wolfenzon, D. (2006): "A Theory of Pyramidal Ownership and Family Business Groups", The Journal of Finance, 61(6), pp. 2637-2680.

Amaral, P.S. and Quintin, E. (2010): "Limited Enforcement, Financial Intermediation, and Economic Development: a Quantitative Assessment", International Economic Review, 51(3), pp. 785-811.

Antunes, A., T. Cavalcanti and A. Villamil (2008). "The Effect of Financial Repression & Enforcement on Entrepreneurship and Development," Journal of Monetary Economics 55(2): 278-297.

Banerjee, A., and Munshi, K. (2004): "How Efficiently is Capital Allocated? Evidence from the Knitted Garment Industry in Tirupur", *Review of Economic Studies*, 71(1), pp. 19-42.

Becht, M., and DeLong, J.B. (2005): "Why has there been so little blockholding in America?", in Morck, R. (ed.), *The History of Corporate Governance around the World: Family Business Groups to Professional Managers*, University of Chicago Press.

Bennedsen, M., Nielsen, K., Perez-Gonzales, F., and Wolfenzon, D. (2007): "Inside the Family Firm: The Role of Families in Succession Decisions and Performance", The Quarterly Journal of Economics, 122(2), pp. 647-691.

Bertrand, M., Johnson, S., Samphantharak, K., and Schoar, A. (2008): "Mixing Family with Business: A Study of Thai Business Groups and the Families Behind Them", Journal of Financial Economics, 88(3), pp. 466-498.

Bhattacharya, U., and Ravikumar, B. (2001): "Capital Markets and the Evolution of Family Businesses", *Journal of Business*, 74(2), pp. 187-219.

Bhattacharya, U., and Ravikumar, B. (2003): "From Cronies to Professionals: The Evolution of Family Firms", unpublished, Indiana University.

Bloom, N., and Van Reenen, J. (2010): "Why do management practices differ across firms and countries?", Journal of Economic Perspectives, 24(1), pp. 203-224.

Bloom, Nicholas, Benn Eifert, David McKenzie, Aprajit Mahajan & John Roberts (2011): "Does Management Matter: Evidence from India," unpublished, Stanford University.

Bouchard, T., and McGue, M. (1981): "Familial Studies of Intelligence: A Review", Science, 10, pp. 1055-1058.

Buera, F.J., Kaboski, J.P. and Shin, Y. (2010): "Finance and Development: a Tale of Two Sectors", American Economic Review, forthcoming.

Burkart, M., Panunzi, F., and Shleifer, A. (2003): "Family Firms", *Journal of Finance*, 58(5), pp. 2167-2201.

Burstein, A., and Monge-Naranjo, A. (2009): "Aggregate Consequences of Foreign Firms in Developing Countries", Quarterly Journal of Economics, 124(1), pp. 149-195.

Cagetti, M., and De Nardi, M. (2006): "Entrepreneurship, Frictions and Wealth", Journal of Political Economy, 114(5), pp. 835-870.

Caselli, F. (2005): "Accounting for Cross-Country Income Differences", *Handbook of Economic Growth*, pp. 679-741.

Caselli, F., and Coleman, W. J. II (2006): "The World Technology Frontier", American Economic Review, 96(3), pp. 499-522.

Caselli, F., Esquivel, G., and Lefort, F. (1996): "Reopening the Convergence Debate: A New Look at Cross-Country Growth Empirics", *Journal of Economic Growth*, 1(3), pp. 363-389.

Caselli, F., and Feyrer, J. (2007): "The Marginal Product of Capital", Quarterly Journal of Economics, 122(2), pp. 535-568.

Caselli, F., and Gennaioli, N. (2005): "Credit Constraints, Competition and Meritocracy", *Journal of the European Economic Association*, 3(2-3), pp. 679-689.

Caselli, F., and Gennaioli, N. (2008): "Economics and Politics of Alternative Institutional Reforms", Quarterly Journal of Economics, 123(3), pp. 1197-1250.

Caselli, F., and Morelli, M. (2004): "Bad Politicians", *Journal of Public Economics*, 88(3-4), pp. 759-782.

Castro, R., Clementi, G.L., and McDonald, G. (2004): "Investor Protection, Optimal Incentives, and Economic Growth", *Quarterly Journal of Economics*, 119(3), pp. 1131-1175.

Chami, R. and IMF Institute (2001): "What's Different About Family Businesses?", *IMF Working Paper*, 01/70.

Chandler, A.D. (1994): *Scale and Scope: The Dynamics of Industrial Capitalism*, Belknap Press.

Claessens, S., Djankov, S., and Lang, L. H. P. (2000): "The Separation of Ownership and Control in East Asian Corporations", *Journal of Financial Economics*, 58(1-2), pp. 81-112.

Cooley, T. F., and Prescott, E. C. (1995): "Economic Growth and Business Cycles", in T.F. Cooley (ed.), *Frontiers of Business Cycle Research*, Princeton University Press.

Davis, P. (1983): "Realizing the Potential of the Family Business", *Organizational Dynamics*, 12(1), pp. 47-56.

Djankov, S., Hart, O., McLiesh, C. and Shleifer, A. (2008): "Debt Enforcement around the World", Journal of Political Economy, 116(6), pp. 1105-1149.

Djankov, S., La Porta, R., Lopez-de-Silanes, F., and Shleifer, A. (2003): "Courts", Quarterly Journal of Economics, 118(2), pp. 453-517.

Ellul, A., Pagano, M. and Panunzi, F. (2010): "Inheritance Law and Investment in Family Firms", The American Economic Review, 100(5), pp. 2414-2450.

Evans, D. S., and Jovanovic, B. (1989): "An Estimated Model of Entrepreneurial Choice under Liquidity Constraints", *Journal of Political Economy*, 97(4), pp. 808-827.

Franks, J. R., and Torous, W. N. (1994): "A comparison of financial recontracting in distressed exchanges and Chapter 11 reorganizations", *Journal of Financial Economics*, 35(3), pp. 349-370.

Galor, O., and Tsiddon, D. (1997): "Technological Progress, Mobility and Economic Growth", *American Economic Review*, 87(3), pp. 363-382.

Gersick, K., Davis, J., and McCollom Hampton, M. (1997): *Generation to Generation: Life Cycles of the Family Business*, Harvard Business School Press.

Ghatak, M., Morelli, M., and Sjöstrom, T., (2002): "Credit Rationing, Wealth Inequality, and the Allocation of Talent", *STICERD Discussion Papers*, n. TE/02/441, London School of Economics and Political Science.

Giné, X., and Townsend, R. M., (2004): "Evaluation of Financial Liberalization: A General Equilibrium Model with Constrained Occupation Choice", *Journal of Development Economics*, 74(2), pp. 269-307.

Greenwood, J., Sanchez, J. and Wang, C. (2010): "Quantifying the Impact of Financial Development on Economic Development", NBER Working Paper, n. 15893.

Guner, Nezih, Gustavo Ventura, and Xu Yi (2008): "Macroeconomic Implications of Size-Dependent Policies," Review of Economic Dynamics, vol. 11, no. 4, (October 2008), 721-744.

Hall, R. E., and Jones, C. I. (1999): "Why do Some Countries Produce so Much More Output per Worker than Others?", *Quarterly Journal of Economics*, 114(1), pp. 83-116.

Hassler, J., and Mora, J. V. R. (2000): "Intelligence, Social Mobility and Growth", *American Economic Review*, 90(4), pp. 888-908.

Hendricks, L. (2002): "How Important is Human Capital for Development? Evidence from Immigrant Earnings", *American Economic Review*, 92(1), pp. 198-219.

Hsieh, C.T. and Klenow, P.J. (2009): "Misallocation and Manufacturing TFP in China and India", *Quarterly Journal of Economics*, 124(4), pp. 1403-1448.

Hurst, E., and Lusardi, A. (2004): "Liquidity Constraints, Household Wealth, and Entrepreneurship", *Journal of Political Economy*, 112(2), pp. 319-47.

Islam, N. (1995): "Growth Empirics: A Panel Data Approach", *Quarterly Journal of Economics*, 110(4), pp. 1127-1170.

Jensen, M. C. (1988): "Takeovers: Their Causes and Consequences", Journal of Economic Perspectives, 2(1), pp. 21-48.

Jeong, H., and Townsend, R. M. (2005): "Discovering the Sources of TFP Growth: Occupational Choice and Financial Deepening", *IEPR Working Papers*, 05/19.

Kiyotaki, N. (1998): "Credit and Business Cycles", *Japanese Economic Review*, 49(1), pp. 18-35.

Klenow, P., and Rodriguez-Clare, A. (1997): "The Neoclassical Revival in Growth Economics: Has it Gone Too Far?", *NBER Macro Annual 1997*, pp. 73-114.

Knack, S., and Keefer, P. (1995): "Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures", *Economics and Politics*, 7(3), pp. 207-227.

Landes, D. (1969): *The Unbound Prometheus: Technological Change and Industrial Development in Western Europe from 1750 to the Present*, Cambridge University Press.

Lansberg, I. (1983): "Managing Human Resources in Family Firms: The Problem of Institutional Overlap", *Organizational Dynamics*, 12(1), pp. 39-46.

La Porta, R., Lopez-De-Silanes, F., and Shleifer, A. (1999): "Corporate Ownership Around the World", *Journal of Finance*, 54(2), pp. 471-517.

Lloyd-Ellis, H., and Bernhardt, D. (2000): "Enterprise, Inequality, and Economic Development", *Review of Economic Studies*, 67(1), pp. 147-168.

Lucas, R. E. Jr. (1978): "On the Size Distribution of Business Firms", *Bell Journal of Economics*, 9(2), pp. 508-523.

Mann, T. (1901): *Buddenbrooks*, S. Fisher Verlag.

Maoz, Y. D., and Moav, O. (1999): "Intergenerational Mobility and the Process of Development", *Economic Journal*, 109(458), pp. 677-697.

Morck, R., and Steier, L. (2005): "The Global History of Corporate Control: An Introduction", *NBER Working Paper*, n. 11062.

Morck, R., Strangeland, D., and Yeung, B. (2000): "Inherited Wealth, Corporate Control, and Economic Growth: The Canadian Disease?", in Morck, R. (ed.), *Concentrated Corporate Ownership*, NBER Conference Volume, University of Chicago Press.

Morck, R., Wolfenzon, D., and Yeung, B. (2005): "Corporate Governance, Economic Entrenchment and Growth", Journal of Economic Literature, 43(3), pp. 655-720.

Mulligan, C. (1997): *Parental Priorities and Economic Inequality*, University of Chicago Press.

Murphy, K. M., Shleifer, A., and Vishny, R. W. (1991): "The Allocation of Talent: Implications for Growth", *Quarterly Journal of Economics*, 106(2), pp. 503-530.

Parente, S. L., and Prescott, E. C. (2000): *Barriers to riches (Walras-Pareto Lectures)*, MIT Press.

Perez-Gonzales, F. (2006): "Inherited Control and Firm performance", American Economic Review, 96(5), pp. 1559-1588.

Quintin, E. (2008): "Limited Enforcement and the Organization of Production", Journal of Macroeconomics, 30(3), pp. 1222-1245.

Restuccia, D., and Rogerson, R. (2004): "Policy Distortions and Aggregate Productivity with Heterogeneous Establishments", Review of Economic Dynamics, 11(4), pp. 707-720.

Rodrik, D., Subramanian, A. and Trebbi, F. (2004), "Institutions Rule: The Primacy of Institutions Over Geography and Integration in Economic Development", Journal of Economic Growth 9(2), pp. 131-165.

Shleifer, A., and Wolfenzon, D. (2002): "Investor Protection and Equity Markets", *Journal of Financial Economics*, 66(1), pp. 3-27.

Solon (1992): "Intergenerational Income Mobility in the United States", *American Economic Review*, 82(3), pp. 393-408.

Solow (1956): "A Contribution to the Theory of Economic Growth", *Quarterly Journal of Economics*, 70(1), pp. 65-94.

Villalonga, B., and Amit, R. (2006): "How do Family Ownership, Management, and Control Affect Firm Value?", Journal of Financial Economics, 80(2), pp. 385-417.

Volpin, P. (2002): "Governance with Poor Investor Protection: Evidence from Top Executive Turnover in Italy", *Journal of Financial Economics*, 64(1), pp. 61-90.

Zimmerman (1992): "Regression towards Mediocrity in Economic Status", *American Economic Review*, 82(3), 409-29.