

**Who's in The Forbes Global 2000?**  
**The Role of Home Market, Multinational Firm, Economic  
Development, and State Capitalism**

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August 17, 2012

**ABSTRACT**

We investigate the determinants of country ownership of world's biggest public companies, using the Forbes Global 2000 data across forty-eight countries and sixteen industries in the period of 2004-2010. A country may own more world-class enterprises in certain industries due to the home market effect to which scale economy and transportation costs are key, due to the multinational firm effect through which domestic multinational firms grow larger due to exposure to foreign markets and foreign multinational firms help to cultivate an environment that fosters more larger domestic companies, due to this country's stage in its economic development, and due to the role of the state involving in its own economic activities. We find significant and positive effects of home market size and multinational firms, using annual GDP and FDI volume as measures, respectively. We also find that there seems to be a trend that emerging countries crowd out so-called colonizing and conventional developed countries, by owning more Forbes Global 2000 firms during this period. Finally, state-capitalism plays a positive and significant role in determining the ownership of the Forbes Global 2000 companies of a country as well.

*Keywords:* Firm Size, Home Market Effect, Multinational Firm Effect, State Capitalism.

*JEL Classification:* F23

## 1. INTRODUCTION

In the history of industrial evolution, we frequently observe firms rising in the early stage and its number grows progressively then slows down. Finally, as the industry developed to a mature stage, the firm number began to decline. While most of the firms are toppled from competition ground, there always remain some firms which are somehow able to survive to the mature stage and last for years or even decades.

Theoretically, the firms that can survive to an industry's mature period should be more competitive than others, either in terms of productivity or efficiency. As is found in the empirical literature, firm size and age have positive relationship with firm's growth and survival. See for example, Evans (1987), Hall (1987), Dunne et al. (1989), Dunne and Hughes (1994) and Lin and Huang (2008). That is, the big firms we observed in the history of business are those that could manage to survive to the mature stage of their industry, and are on average characterized by earlier established and larger in size. This phenomenon implies the importance of large firms and/or older enterprises in shaping the world economy. In fact, as pointed out in Gabel and Bruner (2003), the multinational large companies command more resources and exert a stronger influence than nearly three fourths of all national states. Surprisingly, there is little literature addressing on the questions: What determines the size of a firm under equilibrium or at the mature stage of an industry? What follows, in the globalization era, is the question: why a country has more large firms in some industries than others?

The purpose of this paper is twofold. Firstly, through a critical literature review, we sum up the factors that may contribute to the firm size, and raise four testable hypotheses about the country distribution of the world's large firms: the home-market effect (HME) hypothesis, the multinational enterprises (MNE) hypothesis, economic-development hypothesis and the state-capitalism hypothesis. Secondly, we establish a panel data ranged from 2004 to 2010 of the top-2000 largest MNE firms, based on the public database of the Forbes Global 2000 database (hereafter FG2K), and test these hypotheses.

### **The determinants of firm size**

Factors that affect a firm's size can be attributed to country-specific, firm-

specific, industry-specific features, or any combinations of them. One of the most important country-specific factors is probably the country size, or more precisely the domestic market size as represented by GDP. Theoretically, we would expect a country with greater market size to support more big firms for any industry with the property of increasing returns to scale (TRTS) in equilibrium at its mature stage under autarky, and even more so under free trade. In fact, this is consistent with the so-called home-market effect (HME) in the trade literature. It is said that a larger country not only can support more firms than a smaller one for an IRTS industry under autarky, but also can expand its number of firms, by shrinking his trade partner's market share under free trade. As a result, the bigger country in the IRTS industry will have more than proportional share of the global market.<sup>1</sup> In addition, empirical studies show that the degree of HMEs differs from industry to industry, for example, Schumaner and Siliverstovs (2006) and Huang and Huang (2011). More specifically, the capital-intensive industries are found to have higher degree of HME than those of labor-intensive industries, implying the industry with higher economy of scale will have greater HME. Thus, we can come up with the following testable hypothesis, named as *industry-differential HME hypothesis*: A country with bigger GDP will have more large firms, especially for industries of higher minimum efficient scale (MES) or higher degree of IRTS.

Among the firm-specific factors, one of the most significant is the firm's ownership, such as private- or state-owned, multinational enterprise (MNE) or non-MNE, business-group or individual competing firms. In general, a state-owned enterprise tends to be larger than the private firms. Conglomerate firms are also usually bigger than individual firms. Due to the higher fixed costs for foreign direct investment (FDI) than for exporting or staying domestically, the MNEs inherently have higher productivity than non-MNEs, reflected in their technological advantage and/or scale advantage. And, because of the network effect within its group, a MNE-affiliated firm generally adjusts to the minimum efficient scale more quickly and efficiently, and thus more likely to survive.<sup>2</sup> Consequently, we should observe a country with more MNEs appears to have greater FDI and thus more large firms, to

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<sup>1</sup> See Krugman (1979, 1980), and Helpman and Krugman (1985) for the theoretical derivation of the HME.

<sup>2</sup> It is well documented in the literatures that MNEs are in general more productive, in terms of scale efficiency and/or technological advantage than those exporting firms, which in turns are more productive than the domestic firms. See Markusen (2002) for the technologic efficiency arguments, and Balk (2001) and Lucas (1988) for the argument of scale efficiency. See also Girma and Gorg (2007) for an empirical test.

which we refer it as the *MNE hypothesis* or *FDI hypothesis*.

Of course, why a country owns more MNEs than others can be attributed to yet other country-specific factors. For example, due to some historical “accidents”, economically well-developed countries, mostly in OECD or those centuries-old colonizing countries in the last century, should own more MNEs than those once-colonized and lately independent countries and/or the emerging economies. We refer to this as the *economic development effect*. For this version of such effect, we would expect that older countries tend to have more large firms than the younger ones.

Such economic development effect, however, may become more significant in the conventional capital intensive industries which are characterized by the technological regime of creative accumulation.<sup>3</sup> This is because the technology innovation in this regime is basically to improve the current technology, rather than to replace it. As a result, the incumbent firms may incur lower costs to adopt new technologies and to increase its competitiveness. Namely, this type of industry has the property of early-leader’s advantage, which is beneficial to older countries as well.<sup>4</sup> From this viewpoint, for the conventional industries like automobile and steel, most of the dominants firms in the global market are the old ones, and mostly from the developed countries.

In contrast, for the industries characterized by more of destructive innovation, like the modern information technology industry, the incumbent firms may find little incentive to adjust to the new technologies in time, due to the higher sunk costs and the myth of ongoing high market share. In these industries, we should observe relatively more firms arising in the emerging economies, and finally grow to large scaled enterprises at the mature stage of the evolutionary industries. Therefore for this version of the economic development effect, we would expect that the emerging countries will start to catch up the well-developed ones, especially in these industries.

In addition, there are country-specific **institutional factors**, which may indirectly and deeply shape the firms’ structure of organization. The *national business system*, defined by Whitley (1999) as institutions and social norms that govern the bridge between providers and users of capital in the economy, the relations between

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<sup>3</sup> See Lin and Huang (2008) and references therein, for a discussion on the technological regimes and new-firm advantage in the creative destruction industries.

<sup>4</sup> We borrow the term of early-leader advantage from Owen (2010), in which the early leaders’ advantage refers to the customers’ preference attachment to the familiar varieties. In this type of industry, a newcomer has to overcome the customer’s attachment to the existing and well-known brand.

employers and employees, between the state and private, between the capitalists and society. As discussed in Owens (2011), the national institutions and norms have deep historical roots to affect what a firm does, not only in regular days but also when encountering a global crisis. Firms in countries characterized by shareholder-oriented capitalism (sometimes called free-market economy, or stock-market capitalism) such as the U.K. and U.S. are more likely to go bankrupt or being merged than firms in other countries. Firms in countries featured with stakeholder-oriented capitalism (alternatively called as welfare-capitalism, or coordinated market economy), mostly in East Asia, are more persistent in keeping firms alive and running even unprofitable. The society in these countries puts higher premium on the sustainability of a large company. In the country of welfare capitalism or coordinated market economy, the government plays a rather active role, in terms of governing the state and private capital to favor targeted firms for selected strategic industries. Typical examples include Japan, South Korea, Singapore and Taiwan beginning in 1960s and 70s and China after its opening up in the 1980s.<sup>5</sup> Realizing the active and dominating role of the state in governing the flows for capital, and for the ease of writing, we name this type of countries as “**state-capitalism**” hereafter. Obviously, a country of state-capitalism may be more likely to have higher concentration ratio in all industries.

Briefly, we can summarize the factors that contribute to a firm’s size or more specifically the country distributions of large enterprises, into four categories: the Home-market effect which may vary from industry to industry, the MNE effect, the economic development effect, and state capitalism effect.

Beginning in 2004, the *Forbes magazine* began to rank existing enterprises in the world and reports the top 2000 enterprises, the FG2K. Despite the ranking is based on a complex index of four dimension of assets, annual sales, profitability and market value, it is in general a firm-size ranking. For each firm, the data reveals not only the four above-mentioned variables, but also the nationality and the industry category of its products. As expected, almost all the firms are multinational enterprises (MNEs), featured with FDI and thus, having subsidiary companies located abroad. With this dataset we can compute the number of firms for each country of each year that are

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<sup>5</sup> Alternative to the firm-specific conglomerate are those due to state intervention, such as the business group in Taiwan, chaebol in South Korea and Keiretsu in Japan. See Feenstra et al. (2003) for a discussion on the role of government intervention in shaping the business structure of the three countries. See also Jwa (2002) for the role of state in the South Korea’s big enterprises and Morikawa (1992) for the case of Japan.

listed in the FG2K, i.e., the nationality distribution of the Global 2000 firms to test the four hypothesis above-mentioned.

The rest of this paper is organized as follows: In the next section, the data of the FG2K and some stylized facts are reported. Section 3 briefs the hypotheses and the related empirical strategies are introduced. Section 4 reports the empirical results. Section 5 concludes the paper.

## 2. DATA AND STYLIZED FACTS

### 2.1. Data

The dataset we use in this paper is the Forbes Global 2000, one of the most reliable ranking lists about the performance and scale of public companies in the world, in the period of 2004-2010. Since 2004, the *Forbes magazine* has been published this annual ranking of globally top 2000 public companies, using a mix of four metrics of sales, profits, assets and market value offered by different sources including Thomson Reuters Fundamentals, Worldscope databases, among others. The complete list usually contains the following information of the FG2K firms: company name, rank, country, industry, sales, profits, market values, and assets.

After 2011, however, this list adopts more detailed classification of industrial category and thus the number of industries rises from 27 to 81.<sup>6</sup> This generates a problem of data concordance between the old and new industrial categories and requires manual data adjustment.<sup>7</sup> We then stack and pool the complete list of all seven years, sort it by company name, and check company by company for concordance to assure that the industrial category of any company is consistent before and after 2011. Even so, there are still many companies that do not appear in all seven years or in 2011 due to this classification change. We thus have to identify these company's industrial categories by understanding one by one their contents of businesses, which takes time and objective judgments. In the end, we divide industries into 16 categories, as shown in Table 1.

With the manual data adjustment mentioned, we finally get a complete panel data

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<sup>6</sup> The classification change in 2011 applies to the data of 2010.

<sup>7</sup> For example, a company that belongs to the old industrial category of "Media" supposedly maps to one of the following three new categories: "Advertising", "Broadcasting & Cable", and "Printing & Publishing" and vice versa. Many mega firms in the list, however, fail to follow this rule.

of the Forbes Global 2000. This data set, however, is an unbalanced one in terms of its firms' nationalities since in some years some countries own no FG2K firms. To get a balanced panel data set, we keep those firms whose owning countries possess them in all seven years and drop otherwise. As a result and as shown in Table 2, only 48 out of 69 countries are observed in the data. Our data set, in the end, contains the FG2K firms in seven years that are distributed across 16 industries and owned by 48 countries. Though not being able to show the complete list for all seven years due to the space limit, we show in Table 3 the distribution of firm number across 16 industries and 48 countries in 2010.

For other macro data required in our empirical analysis, we obtain the data of gross domestic product (GDP), gross national income per capita (GNIPC) from the World Development Indicator (WDI) of World Bank, and the inward and outward stocks of FDI index from UNCTAD. For legible purpose, the unit of macro data is scaled down to million U.S. dollar for GNIPC and trillion U.S. dollar for GDP and FDI indices.

## **2.2. Stylized Facts**

We observe the dataset from two aspects: the industry and country distributions. The industry distribution of the FG2K firms is related to various factors such as the industry-level property of IRTS, technology regime, or factor intensity. As mentioned earlier, in the industries of IRTS, the scale of firm size tends to be larger, and with entering the global market, the number of such large firms will tend to be higher in these industries, so is the possibility of these firms ranking in the Forbes Global 2000. These industries usually include banking, financing, some conventional industries like automobiles and steels, and some emerging industries like computer hardware. Notice that some IRTS industries such as aerospace and defense or oil and gases usually cannot generate many large firms, probably because of the restriction of the global market size or volume of resources.

Table 4 shows the industry distribution for 16 industries in the Forbes Global 2000 in the period of 2004-10. In 2010, the top three industries with most FG2K firms are the industries of banking (307 firms), diversified financing (178), and capital goods (174), with the first two are almost always rank the top two in the whole period. This to some extent indicates that the higher the level of increasing returns to scale in an industry, the more FG2K firms are in this industry.

Another thing interesting worth pointed out is the industry of oil and gases. In

this industry, though the average volume of capital and sales of the FG2K firms is high, the number of them is relatively low due to the restriction of the volume of resources. This can be seen in Table 5, which lists the seven-year average firm number, capital, sales, capital per firm, and sales per firm. We can see that though the industry of oil and gases ranks the ninth in the firm number, its rankings are both the fifth in capital (and per firm), and are both the first in sales (and per firm). This suggests that the significant role of the restriction of the resource volume mentioned earlier.

The country distribution of the FG2K firms is affected by the following factors: (1) home market effect; (2) multinational firm effect; (3) economic development effect; and (4) state capitalism effect. Table 6 illustrates this distribution for 69 countries.<sup>8</sup> As shown there, in 2004, the country which possesses the most FG2K firms is the U.S. (711 firms), followed by Japan (326), the U.K. (134), Canada (67), Germany (63), and France (62). This ranking in 2010 is the U.S. (536), Japan (260), China (121), the U.K. (86), Canada (67), and France (67). Let us also observe how the four NIEs countries change in the two beginning and ending years of the data. In 2004, their ranking is South Korea (42), Taiwan (35), Hong Kong (32) and Singapore (13); while in 2010, it becomes South Korea (61), Hong Kong (46), Taiwan (40) and Singapore (19).

Comparing the rankings of the two years for both leading and NIEs countries, we can see that: (1) though the ranking of the leading countries remains similar, the top three countries have lost many of their shares in Forbes Global 2000 (24.61% for the U.S., 20.25% for Japan, and 35.82 for the U.K.); (2) China thrives very quickly from owning 21 firms in 2004 to 121 firms in 2010; (3) the emerging countries also have grown quickly (45.24% for South Korea, 43.75% for Hong Kong, 14.29% for Taiwan, and 46.15 for Singapore). Together with China's fast thriving, this seems to imply that the emerging economies have been starting to occupy a fair share in Forbes Global 2000.

These observations also to some extent link to at least three of the four effects: the home market, economic development, and state capitalism effects. For the home market effect, the fact that the leading countries are all of large scale (regardless of the measures of GDP, population, or others) seems to indicate that the larger the domestic market a country has, the more FG2K firms it will possess. Figure 1 may help us

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<sup>8</sup>To get balanced data, among the sixty nine countries, we keep only forty eight countries that possess firms in Forbes Global 2000 in all seven years in the period of 2005-2011.



identify this effect. By illustrating the distributions of the GDP and their firm numbers in the Forbes Global 2000 of 46 countries in 2010, we can see that the two distributions share similar pattern, implying that countries with high GDP tend to own more FG2K firms.

For the economic development effect, the fact that most advanced economies have high but are losing while many emerging countries are gaining their shares in this rank probably suggests that a country in its later stage of economic development will have high but decreasing while one in its early stage will have low but increasing FG2K firms. For the state capitalism effect, the example that China and South Korea are having more FG2K firms may imply that state capitalism helps a country to foster large firms.

### **3. HYPOTHESIS AND METHODOLOGY**

Although the Forbes Global 2000 rank provides an overview for the performance of individual companies, in this paper we instead focus on the country-industry pattern of these firms. For the 48 countries, the firm numbers a country possesses in the 16 industries over the seven years offer us hints about which industries this country dominates in, and even about the tendency of its economic development. Our interest in this paper is then mainly about what affects the country distribution of the FG2K firms. Four hypotheses are proposed and described in details below.

#### **3.1. Hypotheses**

##### **Home market effect**

The home market effect, initiated by Krugman (1980), argues that a specific industry may bloom in large markets due to firms' behavior of cost minimization because of the existence of the industry property of IRTS and transportation costs. To measure the degree of the market size of a country, we use GDP as a proxy. Hence the home market effect in this paper means: for a given industry and a year, the larger the GDP level a country has, the larger the market it will own, and thus the more FG2K firms it possesses.

##### **Multinational firm effect**

Multinational firms may facilitate the emergence of domestic large firms of a

country mainly through two channels. First, with their inward FDI, foreign MNEs introduces advanced intangible assets such as technologies, management skills, or marketing strategies that help enlarge the scale of domestic firms through spillover effect. Second, with their outward FDI, domestic MNEs become larger due to exposure to higher foreign demands and advanced intangible assets. We call the effects through these two channels as “inward” and “outward” multinational firm effects, respectively. In the empirical model, we use inward and outward FDI stock levels as the proxies for the activities of the foreign and domestic MNEs, respectively.

### **Economic development effect**

The level of economic development of a country may also affect the number of FG2K firms it possesses. Advanced countries such as those centuries-old colonizing countries or the United States have dominated the world economy for centuries. Their companies have long been well developed, of large scale, and lead in almost all industries, especially in those of creative accumulation such as automobiles. The emerging economies, however, due to their late entry in the global economy, concentrate more in the industries of creative destruction such as electronics in which the large firms relatively more easily to arise. We use two measures to capture the level of economic development: One is the per capita GNI, and the other is the country or regional dummy variables.

### **State capitalism effect**

Firms in countries of stakeholder-oriented capitalism grow and survive relatively more easily than those in countries of shareholder-oriented capitalism. Hence the large firms emerge more easily in the former countries than the latter. Due to lack of great measures for state capitalism thus far, in this paper we simply use country dummy variables as proxies.

## **3.1. Econometric Model**

The empirical model in this paper mainly bases on the Forbes Global 2000 panel dataset that contains global gigantic firms of 48 countries in 16 industries within 7 years.<sup>9</sup> In the benchmark model we consider only the home market effect, the

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<sup>9</sup> As mentioned earlier, for concordance between the classification differences in industrial category before and after 2011, we combine and re-classify the 81 industries into 16, as shown in the appendix.

multinational firm effect, the economic development effect. The benchmark model (Model 1) is then:

$$\begin{aligned} Firmnum_{ijt} = & \beta_0 + \beta_1 GDP_{it} + \beta_2 GNIPC_{it} + \beta_3 InFDI_{it} + \beta_4 OutFDI_{it} \\ & + \beta_5 Timetr_d_t + \beta_6 InFDI\_t_{it} + \beta_7 OutFDI\_t_{it} + \varepsilon_{ijt} \end{aligned} \quad (1)$$

where  $i$  stands for country,  $t$  for year,  $Firmnum_{ijt}$  for the firm number country  $i$  owns in industry  $j$  in year  $t$ ,  $GDP_{it}$  for the gross domestic product of country  $i$  in year  $t$ ,  $GNIPC_{it}$  for the gross national income per capita of country  $i$  in year  $t$ ,  $InFDI_{it}$  and  $OutFDI_{it}$  for the stock of inflow and outflow FDI of country  $i$  in year  $t$ , respectively;  $Timetr_d_t$  represents time trend and equals 1 through 7 for year 2004 to 2010;  $InFDI\_t_{it}$  and  $OutFDI\_t_{it}$  are the cross product terms of inward and outward FDI stocks with the time trend dummies, respectively; and lastly,  $\varepsilon_{ijt}$  is the residual term. Notice that the intercepts in equation (1) can be heterogeneous but constant or random across observation units, depending on which of fixed effect or random effect models we choose.<sup>10</sup> We will come back to this choice in the next paragraph. In sum, Table 8 lists these variables and the predicted signs of their coefficients, for the benchmark model and the following models.

The most frequently used models for panel data are fixed and random effect models. The main difference between the two models is that the former assumes that each observation unit has its own constant intercept (fixed effect) to be estimated; while the latter assumes their intercepts to be random. To evaluate which model to adopt, we apply the Hausman test and the result shows in Table 7. The Chi-square value of 576.65 suggests that the fixed effect model works more appropriately for our study.

The home market effect varies across industries since the properties such as IRTS or factor intensity are different across industries. We therefore investigate the industry specific home market effect with the following model (Model 2):

$$Firmnum_{ijt} = Benchmark + \sum_{j=1}^{16} \beta_{8,j} GDP\_dInd_{ij} + \varepsilon_{ijt} \quad (2)$$

where  $GDP\_dInd_{ij}$  stands for the cross product term of the GDP of country  $i$  and the dummy variable of industry  $j$ .

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<sup>10</sup> The observation unit here is a given specific industry in a given country.

The multinational firm effect may also vary across industries. We thus follow Model 2 but introduce instead the industry-specific cross product terms for inward and outward multinational firm effects, respectively, which is Model 3 below.

$$Firmnum_{ijt} = Benchmark + \sum_{j=1}^{16} \beta_{9,j} InFDI\_dInd_{ij} + \sum_{j=1}^{16} \beta_{10,j} OutFDI\_dInd_{ij} + \varepsilon_{ijt} \quad (3)$$

where  $InFDI\_dInd_{ij}$  and  $OutFDI\_dInd_{ij}$  represent the cross product terms for the inward and outward FDI stocks of country  $i$  with the dummy variable of industry  $j$ , respectively.

Lastly, to estimate and test the country-specific or group-specific effect of economic development, we develop the following two models. In Model 4, we create the cross product terms of the two dummy variables of country and time trend, in order to examine whether different countries have different trends in the ranking of the Forbes Global 2000.

$$Firmnum_{ijt} = Benchmark + \sum_{k=1}^{22} \beta_{11,k} t\_dCty_{kt} + \varepsilon_{ijt} \quad (4)$$

where  $k$  designates the 22 countries we are especially interested among the 48 countries, and  $t\_dCty_{kt}$  is the cross product term of the country and time trend dummy variables.

In Model 5, we generate four group dummy variables for the NIEs countries, emerging Tigers countries, NAFTA countries without the U.S., and colonizing countries without the U.K., in addition to four single countries of the U.S., the U.K., Japan, and China. The cross product terms in model 5 are then the mix of the country-trend and group-trend cross product terms, as follows.

$$Firmnum_{ijt} = Benchmark + \sum_{k=1}^4 \beta_{12,k} t\_dCty_{kt} + \sum_{m=1}^4 \beta_{13,m} t\_dGrp_{mt} + \varepsilon_{ijt} \quad (5)$$

where  $m$  stands for the 4 groups, and  $t\_dGrp_{mt}$  the cross product terms of the group and time trend dummy variables.

### 3.3. Testing for Unit Root

The panel dataset of the Forbes Global 2000 contains both time series and cross

sectional information of FG2K firms, which helps to raise the degree of freedom and reduce the estimation bias. Before the regression analysis, however, we should test whether the variables in question are stationary by unit root tests, otherwise it may cause the issue of spurious regression and thus inefficiency results of estimation. Table 9 shows the results of different unit root tests including Levin, Lin and Chu test (LLC), Harris-Tzavalis test (HT), Im, Pesaran and Shin test (IPS) and Breitung test. The variables of *Firmnum*, *GDP*, *GNIPC*, *InFDI* and *OutFDI* all pass at least one test, suggesting little concern for data to be non-stationary.

## 4. EMPIRICAL FINDINGS

In this section, we apply the methodology in the previous section to estimate and test the four hypotheses. In 4.1, we start our analysis by the benchmark model in which we simply consider on average the three effects of home market, multinational firm, and economic development, and then we consider additionally the industry-specific home market effect. In 4.2, we shift our focus on exploring whether the multinational firm effect is different across industries. In 4.3, we further investigate the economic development effect by considering different combinations of country and group dummy variables. Finally in 4.4, we examine whether the state capitalism effect exists.

### 4.1. The Benchmark Model and Industry-Specific Home Market Effect

The benchmark model starts with investigating the average effects of home market, multinational firm, and economic development. To be more specific, following the above order of effects, we are interested in whether a country with higher GDP, higher inward and outward FDI stocks, and higher GNI per capita tends to have more FG2K firms.

Table 10 lists the estimation results for the benchmark model (Model 1) and the one with the cross-product interactive terms of GDP and industry dummy variables (model 2). In the benchmark model, the dependent variable is the number of the FG2K firms a country has in a given year, and the independent variables include GDP, inward FDI stock, outward FDI stock, GNI per capita, time trend, and the cross-product interactive terms of the two FDI stocks and time trend. We can see that

GDP has a positive and significant coefficient of 0.774, suggesting that the home market effect exists with the measure of GDP.

The two FDI stocks have significant and positive effects on the number of FG2K firms a country owns, and the coefficients are 2.215 and 1.455 for inward and outward FDI stocks, respectively. This suggests that the multinational firm effect also exists, through both channels of inward and outward FDIs. The time trend has a positive and significant coefficient of 0.056, implying that on average, a country has more FG2K firms during the observation period. The two cross-product terms of FDI stocks and time trend indicate different results: the inward multinational firm effect does not change over time (since the coefficient is not significantly different from zero), while the outward multinational firm effect, on average, decreases over time (since the coefficient is -0.544 and significant).

We can also see that since the coefficient of GNI per capita is not significantly different from zero, the economic development effect is then not significant. This suggests that there might be some other factors that undermine the effect of GNI per capita, or this measure per se is not a good measure.

In model 2, all results above are the same, except that in addition to the average home market effect (coefficient of 0.422 and significant), we are able to observe this effect industry-specifically. In the following seven industries, the home market effect is significantly different from the average level: higher in the industries of capital goods, consumption goods, diversified finance, materials, and oil and gas; and lower in the industries of consumption services, and market channels. To our surprise, in the latter two industries there exists negative home market effect, probably because some outlier countries such as China. (Is this explanation right? I am not sure because in 2010, say, China has 3 and 2 firms in these two industries, and ranked second in the world, but compared with other big countries, these two numbers are match-able.)

#### **4.2. Industry-Specific Multinational Firm Effect**

In the benchmark model we find that both the inward and outward multinational firm effects are positive and significant, meaning that the economic activities of both foreign and domestic international enterprises help the host country to have more FG2K firms. In this section, however, we explore the industry-specific effect of multinational firms to see whether the above two effects are different in some

industries. This is the specification of Model 3 and Table 11 shows the results.

In Table 11, the inward FDI stock has on average no significant effect on a country's number of the FG2K firms, while the outward FDI stock still has positive and significant effect. The positive inward multinational firm effect still significantly exists in the industries of banking, capital goods, consumption goods, consumption services, diversified financing, intermediate goods, market channels, materials, production services, and utilities, while does not exist in the rest of five industries. The positive outward multinational firm effect still significantly exists in the industries of capital goods, consumption services, intermediate goods, oil and gas, and production services; while does not exist in the industries of communications, construction, insurance, and transportation. Interestingly and surprisingly, this effect is significantly negative in the industries of banking, consumption goods, market channels, diversified finance, and utilities, especially for the first three. This implies that the outward FDI stock of a country will tend to decrease the number of the FG2K firms this country owns in these industries.

Combing the results of both effects, we find that all fifteen industries can be divided into four types. The first type includes the industries of capital goods, intermediate goods, consumption services, and production services. In these industries both effects are positive and significant. A rough observation for these four industries gives us the following impression about the products they produce: two of them offer goods to produce final goods, and two of them offer services. And all these "products" are by and large easily accepted by their "consumers" regardless of where they are. In other words, such industry feature of "universality" may help to smooth firms' international investment and business expansion and hence help their growth.

The second type includes communications, construction, insurance, and transportation. Both effects are not significantly from zero in these industries. These industries seem to share similar feature that firms within them are less easily to expand internationally, probably due to different reasons as follows. For the industries of communications and transportations, the states usually set national entry barriers for concerns such as national security. The firms in the construction industry usually need to access to local workers and construction materials, while those in insurance industry should be familiar with personal values of local people. In contrast to the first type, the second type of industries has similar feature of "locality" and makes their

firms less easily to expand across borders and thus inward and outward FDI may have little impacts on the appearance of large firms.

The third type includes banking, consumption goods, market channels, diversified finance, and utilities. In these industries the inward effect is all positive but outward effect is all zero. This is so probably because of the industry feature of “clustering”, which means that the growing of firms highly depends on how clustered the domestic market size is. For example, in the industries of banking and diversified finance, firms will grow more easily in an environment where more companies, other banks, and depositors cluster, otherwise will grow less easily. In the industries of consumption goods, market channels, and utilities, firms will grow more easily in an environment where more consumers cluster, otherwise will grow less easily. The increase of inward FDI stock in these industries to some extent implies the above clustering and is in favor of fostering large companies, while the increase of outward FDI stock might indicate the opposite of clustering and so is not favor for appearance of such firms.

The last type includes the industries of material as well as oil and gas. The two effects are opposite for these two industries: In the material industry the inward effect is positive but the outward effect is zero, while in the industry of oil and gas it is the opposite. Though the two industries are unique from others in that they heavily depend on the existence of the resources, they are still different from each other in many aspects. One of these aspects possibly related to the mentioned opposite of the two effects is the technology intensity in the two industries: it is relatively highly technology intensive in the industry of oil and gas while lowly intensive in the material industry. As a result, it might be that only a few world-class petroleum corporations that possess highly crude extracting technologies are able to get the extraction rights in the industry of oil and gas, but relatively more national mineral companies that possess enough mining skills may acquire the mining rights in their own countries in the material industry.

The multinational firm effects are hence opposite in the two industries because: In the industry of oil and gas, the extracting right of the crude oil of a country is usually owned by foreign firms. These foreign firms need to make outward FDI and thus only outward FDI has positive relationship with the FG2K firms in this industry. In the material industry, however, the mining right of the resources of a country is



usually mostly owned by its domestic firms. These firms will tend to invest domestically in exploiting the mines and the potential value of the resources will also attract foreign capital and thus only inward FDI significantly helps to foster large firms in this industry. (Is this right?)

### 4.3. Economic Development Effect

In this subsection, we examine the hypothesis that a country in its mature stage of economic development such as colonizing countries will experience a declining firm number in the Forbes Global 2000 while one in its emerging stage like the emerging countries will have an increasing number of such firms.

Following the brief history of economic development, other than some single countries like Japan and China, we divide and focus mainly on the following groups of countries: (1) Colonizing countries (including France, Germany, Netherland, Portugal, Spain, and the U.K.); (2) NAFTA countries (Canada, Mexico and the U.S.); (3) the NIEs (NIES; Hong Kong, Singapore, South Korea and Taiwan); (4) the emerging Tigers (TIGR; Indonesia, Malaysia, Philippines, and Thailand). Table 12 shows the empirical results.

In Table 12, we first explore the country-specific economic development effect over time in Model 4 by introducing 22 cross-product interaction terms of time trend and the 22 countries. In Model 5, we instead examine the group-specific effects considering the above groups of countries.

Let us first look at the country-specific effect shown in Model 4. As seen there, on average, GDP and inward FDI stock have positive and significant impacts on the firm number (coefficients 0.367 and 1.635), with the magnitude of the latter decreasing over time (coefficient of the cross term with time trend -0.288); outward FDI stock, in contrast to inward FDI stock, has a negative impact with its magnitude shrinking over time (coefficient of the cross term with time trend 0.350). (Explain this???) Another point worth noting is that the effect of time trend for Model 4 (so is Model 5) is now insignificant, probably because it is all distributed to the country-specific or group-specific time trend effects.

For the country-specific economic development, the U.S., Japan, the U.K., Germany, France, and Netherland have significantly less FG2K companies during 2004-10, while China, India, South Korea, and Brazil have significantly more such

companies during this period.<sup>11</sup> This result by and large verifies our hypothesis that countries in mature stage of economic development will have less FG2K firms while those in emerging stage will have more such firms, probably because the emerging countries catch up in the industries with the property of destructive innovation.

In Model 5, we consider the following single countries and groups: the United States, the United Kingdom, Japan, China, NAFTA countries without the U.S., the colonizing countries without the U.K., the NIEs countries, and the emerging Tigers.<sup>12</sup> We separate the first four single countries from any groups since they are relatively large in scale and representative in the history of economic development. Table 12 shows the results.

We find in Table 12 that the U.S., the U.K., Japan, and other colonizing countries have significantly less FG2K firms; China and the NIEs countries have significantly more such companies; while the other two countries in NAFTA and the emerging Tigers do not significantly have any changes in the number such firms over time.

We thus far have found that our hypothesis of the economic development effect seems to hold for some specific countries and some groups of countries: the U.S., the U.K., and Japan are losing their shares in the FG2K rank, and so are the other colonizing countries. These countries are all in their mature stages of economic development. For the countries and groups which are in their relatively emerging stages, only China, India, Brazil, South Korea are gaining their shares in this rank, and so are the NIEs countries. Again, this result may also be related to the emerging countries' catching-up in the industries with the property of destructive innovation.

#### **4.4. State Capitalism Effect**

State capitalism usually refers to an economics system in which the state or government undertakes commercial economic activities and manages the productive forces, in order to achieve its objectives of various kinds. In reality, one of its characteristics is that a significant number of state-owned enterprises are owned or controlled by the state. We expect that the undertaking of state capitalism by a country helps to foster its own FG2K firms.

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<sup>11</sup> The order of the two sets of countries follows the magnitude in absolute values of the coefficients of the cross-product terms. That means the number of the Forbes Global 2000 companies in the United States (China) decreases (increases) most quickly over time.

<sup>12</sup> In Table 12, the variable names for these countries and groups, following the order in the context, are *USAS*, *UKIN*, *JPAN*, *CHNA*, *NACM*, *CLUK*, *NIES*, and *TIGR*.

To measure the effect of state capitalism Country dummy, we simply observe the country dummy variables in the previous subsection. Though lacking of precise definition and classification, among the twenty one countries, China, South Korea, and India are usually believed to be those which undertaking state capitalism. In the estimation, we happen to find that the number of FG2K firms rises over time only in these three countries, suggesting the existence of the effect of state.

## 5. CONCLUSION

We investigate in this paper the determinants of country ownership of world's biggest public companies, using the Forbes Global 2000 data across forty-eight countries and sixteen industries in the period of 2004-2010. In particular, we estimate and test four hypotheses: the home market effect, the multinational firm effect, the economic development effect, and the state capitalism effect. A country may own more world-class enterprises in certain industries due to the home market effect to which scale economy and transportation costs are key, due to the multinational firm effect through which domestic multinational firms grow larger due to exposure to foreign markets and foreign multinational firms help to cultivate an environment that fosters more larger domestic companies, due to this country's stage in its economic development, and due to the role of the state involving in its own economic activities. We find significant and positive effects of home market size and multinational firms, using annual GDP and FDI volume as measures, respectively. We also find that there is a trend that emerging countries crowd out so-called colonizing and conventional developed countries, by owning more FG2K firms during this period. Finally, state-capitalism plays a positive and significant role in determining the ownership of the FG2K companies of a country as well.

The main character in the competition of international trade is countries, and the leading role among firms conducting international businesses is the gigantic multinational enterprises. Hence how many such enterprises a country has to a large extent affects the competitiveness of a country in international trade. Though this issue is important, there seems to be little literature studying on it so far. Therefore the main contribution of our work is to explore what determines the international country

distribution of gigantic multinational firms and based on the empirical results we found, we may offer the following policy suggestions.

First, though the significant home market effect indicates that a country with a larger market tends to have more gigantic firms, a country with a smaller market may still be able to develop more such firms by: (1) merging, especially in the years of depression such as financial crisis; (2) focusing on markets of new products, for example Finland's Nokia launching GSM in 1992 and becoming the largest mobile phone company in 1998. Second, given the positive and significant multinational firm effect, the government of a country may consider to: (1) help its domestic firms to expand foreign markets by various international trade and investment measures; (2) attract foreign investment by amending related laws and lowering related costs so as to create an environment; (3) encourage domestic firms' learning of new intangible assets from foreign firms such as technology transfer or even untying the inflow of human capital.

Third, our finding that the emerging countries eventually crowds out the developed economies may offer the following suggestions to the nations of the two kinds: (1) for the emerging countries, they might want to concentrate more in the industries of destructive innovation such as informational technology since these industries are the ones in which they may catch up the developed economics relatively more easily; (2) for the developed economies, to regain their advantage lost mostly in the industries of destructive innovation, their governments might want to offer more policy incentives for firms in these industries to make enough investments. Lastly, though the state capitalism seems to help a country to possess more gigantic firms, such regime has its shortcomings such as resource distortions or corruptions, which may be harmful especially in the era of downturn.

Our work has the following two main limitations and the corresponding future works. First, the focal point of this paper is to investigate the FG2K firm distribution in the aspect of country ownership. The exploration of the determinants of this firm distribution in the industry aspect, however, will also be interesting and worth investigating. For example, the industry specific properties such as factor intensity, scale economy, or innovation characteristics may all affect the FG2K firm distribution. Second, the explanatory variables in our paper are all in country level. Industry-specific variables such as the factor intensity or firm-specific variables such

as each firm's foreign investments or the information of its affiliates might also be helpful in explaining the country distribution of these large firms, if the data is available.

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**Table 1: List of Industries.**

<b>Industry (16)</b>	<b>Code</b>	<b>Forbes Global 2000 Industry Classifications (81)</b>
Banking	Bank	Major Banks, Regional Banks.
Capital goods	Cpgd	Aerospace & Defense, Auto & Truck Manufacturers, Auto & Truck Parts, Communications Equipment, Electrical Equipment, Heavy Equipment, Medical Equipment & Supplies, Other Industrial Equipment.
Communications	Comm	Telecommunications services.
Construction	Cnst	Construction Materials, Construction Services.
Consumption goods	Csgd	Apparel-Accessories, Beverages, Consumer Electronics, Food Processing, Furniture & Fixtures, Household Appliances, Paper & Paper Products, Pharmaceuticals, Precision Healthcare Equipment, Recreational Products, Tobacco.
Consumption services	Cssv	Casinos & Gaming, Healthcare Services, Hotels & Motels, Household-Personal Care, Managed Health Care, Restaurants, Security Systems.
Diversified finance	Divf	Consumer Financial Services, Investment Services, Real Estate, Rental & Leasing, Thrifts & Mortgage Finance.
Insurance	Insr	Diversified Insurance, Insurance Brokers, Life & Health Insurance, Property & Casualty Insurance.
Intermediate goods	Imgd	Biotechs, Computer Hardware, Computer Storage Devices, Electronics, Semiconductors, Specialized Chemicals.
Market channels	Mkch	Apparel-Footwear Retail, Computer & Electronics Retail, Department Stores, Discount Stores, Drug Retail, Food Retail, Home Improvement Retail, Internet & Catalog Retail, Specialty Stores, Trading Companies.
Material	Mtrl	Aluminum, Diversified Chemicals, Diversified Metals & Mining, Forest Products, Iron & Steel.
Oil and gas	Olgs	Oil & Gas Operations, Oil Services & Equipment.
Other services (Ref)	Otsv (Ref)	Advertising, Broadcasting & Cable, Printing & Publishing.
Production services	Pdsv	Business & Personal Services, Business Products & Supplies, Computer Services, Conglomerates, Containers & Packaging, Software & Programming, Trucking.
Transportation	Tnsp	Air Courier, Airline, Other Transportation, Railroads.
Utilities	Utl	Diversified Utilities, Electric Utilities, Environmental & Waste, Natural Gas Utilities.



**Table 2: List of 48 Countries.**

Country	Code	Group	Country	Code	Group
Australia			Liberia		
Austria			Luxembourg		
Belgium			Malaysia	<i>MYSA</i>	Tigers
Bermuda			Mexico	<i>MEXI</i>	NATFA
Brazil	<i>BRAZ</i>		Morocco		
Canada	<i>CAND</i>	NATFA	Netherlands	<i>NETH</i>	Colonizing
Chile			Norway		
China	<i>CHNA</i>		Pakistan		
Czech Republic			Panama		
Denmark			Philippines	<i>PHIL</i>	Tigers
Egypt			Poland		
Finland			Portugal	<i>PORT</i>	Colonizing
France	<i>FRNE</i>	Colonizing	Russia	<i>RUSS</i>	
Germany	<i>GERM</i>	Colonizing	Singapore	<i>SGAP</i>	NIEs
Greece			South Africa		
Hong Kong	<i>HNKG</i>	NIEs	South Korea	<i>SKOR</i>	NIEs
Hungary			Spain	<i>SPAN</i>	Colonizing
India	<i>INDA</i>		Sweden		
Indonesia	<i>INDO</i>	Tigers	Switzerland		
Ireland			Taiwan	<i>TAWN</i>	NIEs
Israel			Thailand	<i>THAL</i>	Tigers
Italy			Turkey		
Japan	<i>JPAN</i>		United Kingdom	<i>UKIN</i>	Colonizing
Jordan			United States	<i>USAS</i>	

*Note:* In the estimation stage, we assume fixed effect and include all panel variables for all 16 industries in 48 countries (totally 468 variables). The country codes and groups listed above are used in the estimation of the effect of evolution of economic development in 4.3. The four groups we consider in this paper are: the NIEs, emerging Tigers, NAFTA without the U.S., and colonizing countries without the U.K. We single out the U.S. and U.K. from NAFTA and colonizing countries in order to identify their distinctive effects.

**Table 3. The Distribution of 16 Industries of 48 Countries in Forbes Global 2000 List, 2010**

Country / Industry	Bank	Cpgd	Divf	Csgd	Mtrl	Mkch	Olgs	Pdsv	Imgd	Utlr	Insr	Cnst	Cssv	Tnsp	Comm	Otsv
Japan	<b>61</b>	<b>30</b>	<b>17</b>	<b>30</b>	<b>15</b>	<b>22</b>	6	7	<b>14</b>	<b>12</b>	5	<b>14</b>	6	<b>13</b>	3	5
United States	<b>28</b>	<b>56</b>	<b>57</b>	<b>47</b>	<b>15</b>	<b>45</b>	<b>36</b>	<b>44</b>	<b>47</b>	<b>38</b>	<b>33</b>	7	<b>41</b>	<b>12</b>	8	<b>22</b>
India	<b>20</b>	3	3	4	7	1	6	4	0	5	0	2	0	0	2	0
China	<b>17</b>	<b>19</b>	<b>16</b>	<b>11</b>	<b>21</b>	3	3	4	1	6	4	8	2	5	1	0
Italy	<b>11</b>	4	2	2	0	0	3	1	0	4	5	1	0	1	1	1
Spain	8	0	2	0	0	1	2	0	0	4	1	6	0	2	1	0
Taiwan	8	1	5	2	2	0	1	1	<b>17</b>	0	1	0	0	0	2	0
Canada	7	3	3	4	<b>10</b>	6	<b>14</b>	1	2	2	5	1	1	3	3	2
Germany	6	7	2	4	8	2	0	5	1	3	4	3	3	3	1	2
France	5	<b>13</b>	6	5	2	4	2	5	2	4	3	6	2	3	1	4
Hong Kong	5	0	<b>13</b>	0	2	3	1	7	1	5	2	0	1	4	2	0
Indonesia	5	0	0	1	1	1	0	0	0	1	0	1	0	0	1	0
Malaysia	5	1	1	3	0	0	2	1	1	2	0	0	1	2	1	0
South Korea	5	8	6	3	5	6	1	4	7	2	5	5	0	2	2	0
Thailand	5	0	1	2	1	0	3	0	2	0	0	1	0	1	1	0
United Kingdom	5	5	9	7	7	9	7	8	1	5	9	3	3	2	2	4
Austria	4	0	0	0	1	0	1	0	0	1	2	1	0	0	1	0
Russia	3	0	0	0	7	2	8	0	2	3	0	0	0	0	1	0
Singapore	3	1	3	3	0	0	0	3	2	0	0	0	1	2	1	0
Ireland	2	2	1	2	0	0	0	5	1	0	0	1	0	1	0	1
Mexico	2	0	0	3	4	3	0	2	0	0	0	1	1	0	1	1
Finland	1	3	0	2	1	1	1	0	0	1	1	1	0	0	0	0
Netherlands	1	1	2	2	3	1	3	2	2	0	2	2	0	2	2	2
Norway	1	0	1	1	1	0	1	0	1	0	2	1	0	0	1	0
Philippines	0	0	0	1	0	1	0	0	0	1	0	0	0	0	1	0

**Table 3. The Distribution of 16 Industries of 48 Countries in Forbes Global 2000 List, 2010 (Continued)**

Country / Industry	Bank	Cpgd	Divf	Csgd	Mtrl	Mkch	Olgs	Pdsv	Imgd	Utlr	Insr	Cnst	Cssv	Tnsp	Comm	Otsv
Australia	6	0	8	2	5	3	4	2	3	2	2	0	1	2	1	0
Belgium	3	1	0	2	2	3	0	0	0	1	1	0	0	0	1	0
Bermuda	0	0	1	1	0	0	2	0	1	0	8	0	0	0	0	0
Brazil	3	2	3	6	5	1	2	2	1	6	2	0	1	2	1	0
Chile	1	0	1	0	3	2	0	1	0	0	0	0	0	1	0	0
Czech Republic	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Denmark	3	1	0	2	0	0	0	1	1	0	0	0	0	1	1	0
Egypt	1	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0
Greece	7	0	0	1	0	0	1	0	0	1	0	0	1	0	1	0
Hungary	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Israel	5	0	2	1	0	0	2	1	0	0	0	0	0	0	1	0
Jordan	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Liberia	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Luxembourg	1	0	0	0	3	0	1	0	0	0	0	0	0	0	1	2
Morocco	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pakistan	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Panama	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Poland	1	0	0	0	1	0	2	0	0	1	1	0	0	0	0	0
Portugal	3	0	0	0	0	2	1	0	0	1	0	0	0	0	1	0
South Africa	2	0	1	1	4	1	1	3	0	0	1	0	0	0	2	1
Sweden	4	7	4	2	2	1	0	1	0	0	0	2	2	0	2	1
Switzerland	7	5	2	5	1	2	4	3	5	2	7	2	0	1	1	0
Turkey	5	1	0	0	0	0	0	2	0	0	0	1	0	1	2	0

Source: The 2011 list of the Forbes Global 2000.

**Table 4: Industry Distribution of the Forbes Global 2000 Enterprises.**

Industry	2004	2005	2006	2007	2008	2009	2010
Banking	292( 1)	298( 1)	293( 1)	302( 1)	294( 1)	297( 1)	307( 1)
Capital goods	159( 4)	159( 4)	157( 3)	162( 3)	171( 3)	168( 3)	174( 3)
Communications	73(15)	68(15)	69(15)	68(14)	75(14)	73(14)	63(15)
Construction	83(13)	81(13)	84(12)	84(12)	78(13)	82(12)	73(12)
Consumption goods	172( 2)	162( 3)	151( 4)	147( 4)	158( 4)	162( 4)	162(4)
Consumption services	95(12)	84(12)	80(13)	64(15)	64(15)	68(15)	69(13)
Diversified financing	164( 3)	170( 2)	194( 2)	203( 2)	201( 2)	169( 2)	178( 2)
Insurance	108( 9)	108(10)	114(11)	102(11)	90(11)	112(10)	106(11)
Intermediate goods	120( 7)	124( 7)	119( 7)	118(10)	113(10)	106(11)	117(10)
Market channels	147( 5)	142( 5)	132( 5)	123( 7)	123( 7)	129( 6)	126( 7)
Material	103(10)	112( 9)	118(10)	127( 5)	140( 5)	142( 5)	143( 5)
Oil and gas	97(11)	105(11)	119( 7)	125( 6)	127( 6)	117( 9)	127( 6)
Other services	57(16)	59(16)	53(16)	50(16)	52(16)	50(16)	48(16)
Production services	133( 6)	127( 6)	119( 7)	122( 9)	114( 9)	127( 7)	121( 8)
Transportation	78(14)	80(14)	78(14)	80(13)	82(12)	77(13)	68(14)
Utilities	119( 8)	121( 8)	120( 6)	123( 7)	118( 8)	121( 8)	118( 9)

*Note:* Source: Forbes Global 2000. The number in each cell is the firm number while the number in the bracket represents the ranking of that industry among all industries in each year.

**Table 5: Annual Statistics of Forbes Global 2000 Enterprises: 2004-2010.**

<b>Industry</b>	<b>Firm Number</b>	<b>Assets (ranking)</b>	<b>Sales (ranking)</b>	<b>Assets p.c. (ranking)</b>	<b>Sales p.c. (ranking)</b>
Banking	297.57	55572.89 (1)	3000.76 (3)	186.75 (1)	10.08 (14)
Diversified financing	182.71	13954.11 (2)	1188.67 (12)	76.37 (3)	6.51 (16)
Capital goods	164.29	3919.88 (4)	3203.58 (2)	23.86 (7)	19.50 (3)
Consumption goods	159.14	2722.27 (7)	2283.15 (5)	17.11 (11)	14.35 (6)
Market channels	131.71	1896.69 (10)	2856.19 (4)	14.40 (13)	21.68 (2)
Material	126.43	1862.78 (11)	1380.70 (9)	14.73 (12)	10.92 (11)
Production services	123.29	2663.27 (8)	1656.10 (7)	21.60 (8)	13.43 (7)
Utilities	120.00	3398.94 (6)	1434.53 (8)	28.32 (6)	11.95 (8)
Oil and gas	116.71	3593.79 (5)	3534.64 (1)	30.79 (5)	30.28 (1)
Intermediate goods	116.71	1337.63 (13)	1358.81 (10)	11.46 (16)	11.64 (10)
Insurance	105.71	13428.88 (3)	1933.43 (6)	127.03 (2)	18.29 (4)
Construction	80.71	1091.09 (14)	875.97 (14)	13.52 (14)	10.85 (12)
Transportation	77.57	1362.81 (12)	824.74 (15)	17.57 (10)	10.63 (13)
Consumption services	74.86	945.07 (16)	878.93 (13)	12.63 (15)	11.74 (9)
Communications	69.86	2429.63 (9)	1215.02 (11)	34.78 (4)	17.39 (5)
Other services	52.71	990.18 (15)	489.51 (16)	18.78 (9)	9.29 (15)

*Source:* Forbes Global 2000. *Note:* Unit: Billion U.S. dollars.

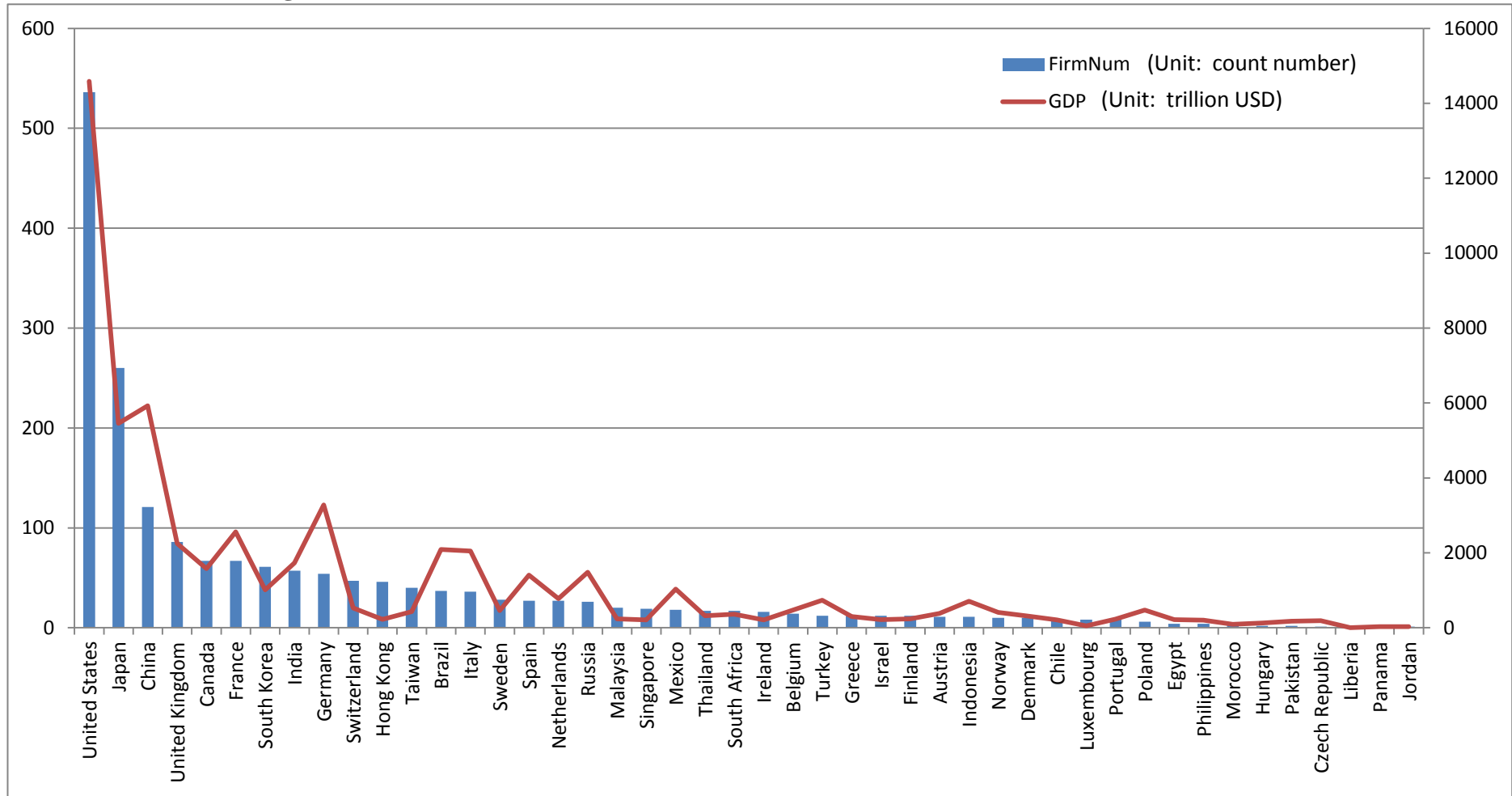
**Table 6: Country Distribution of Forbes Global 2000 Enterprises.**

Country	2004	2005	2006	2007	2008	2009	2010
United States	711(1)	693(1)	659(1)	598(1)	551(1)	536(1)	536(1)
Japan	326(2)	320(2)	291(2)	259(2)	288(2)	270(2)	260(2)
United Kingdom	134(3)	125(3)	126(3)	120(3)	98(3)	90(4)	86(4)
China	21(17)	28(15)	44(9)	70(4)	91(4)	113(3)	121(3)
France	62(6)	67(4)	66(4)	67(5)	72(5)	64(5)	67(5)
Canada	67(4)	60(5)	61(5)	59(6)	55(8)	62(6)	67(5)
Germany	63(5)	58(6)	57(6)	59(6)	57(7)	57(7)	54(9)
South Korea	41(8)	50(7)	52(7)	52(8)	61(6)	51(9)	61(7)
India	30(14)	33(13)	34(15)	48(10)	47(9)	56(8)	57(8)
Australia	37(9)	36(11)	43(10)	50(9)	45(10)	45(12)	41(12)
Hong Kong	32(12)	36(11)	45(8)	39(12)	42(13)	49(10)	46(11)
Switzerland	37(9)	39(10)	36(13)	37(13)	45(10)	48(11)	47(10)
Italy	45(7)	46(8)	42(11)	37(13)	41(14)	38(14)	36(15)
Taiwan	35(11)	41(9)	42(11)	42(11)	45(10)	39(13)	40(13)
Spain	30(14)	29(14)	36(13)	29(16)	33(15)	29(16)	27(17)
Brazil	19(18)	19(18)	22(19)	34(15)	31(16)	33(15)	37(14)
Sweden	28(16)	26(17)	28(17)	29(16)	22(18)	27(18)	28(16)
Netherlands	32(12)	28(15)	29(16)	25(19)	22(18)	23(19)	27(17)
Russia	13(24)	14(23)	20(20)	29(16)	28(17)	28(17)	26(19)
Bermuda	19(18)	17(20)	25(18)	24(20)	19(20)	20(21)	13(28)
South Africa	17(21)	18(19)	16(22)	17(22)	17(23)	23(19)	17(23)
Mexico	18(20)	17(20)	17(21)	16(23)	18(22)	18(22)	18(22)
Malaysia	14(23)	14(23)	14(24)	15(25)	19(20)	18(22)	20(20)
Singapore	13(24)	14(23)	14(24)	18(21)	17(23)	18(22)	19(21)
Finland	15(22)	15(22)	16(22)	16(23)	13(26)	11(34)	12(29)
Thailand	13(24)	13(27)	13(26)	14(26)	10(34)	14(27)	17(23)
Turkey	11(29)	14(23)	11(29)	14(26)	13(26)	12(30)	12(29)
Greece	12(27)	12(28)	12(28)	12(30)	13(26)	13(28)	12(29)
Belgium	12(27)	12(28)	11(29)	12(30)	12(32)	12(30)	14(27)
Austria	9(31)	10(31)	13(26)	13(29)	13(26)	12(30)	11(34)
Ireland	8(33)	8(34)	11(29)	10(34)	9(35)	16(26)	16(25)
Denmark	10(30)	11(30)	10(33)	9(37)	12(32)	13(28)	10(36)
Israel	8(33)	9(32)	9(34)	10(34)	13(26)	11(34)	12(29)
Norway	9(31)	9(32)	11(29)	14(26)	9(35)	10(36)	10(36)
Saudi Arabia	0(53)	5(38)	5(38)	11(32)	15(25)	17(25)	15(26)
Portugal	7(36)	7(35)	8(35)	10(34)	9(35)	9(38)	8(40)

Indonesia	8(33)	7(35)	4(40)	6(41)	6(41)	10(36)	11(34)
Chile	5(37)	6(37)	6(36)	7(39)	8(40)	8(39)	9(38)
Luxembourg	4(39)	5(38)	6(36)	8(38)	9(35)	8(39)	8(40)
United Arab Emirates	0(53)	0(56)	0(58)	11(32)	13(26)	12(30)	12(29)
Poland	2(41)	3(41)	4(40)	4(42)	4(43)	6(41)	6(42)
Kuwait	0(53)	0(56)	0(58)	7(39)	9(35)	6(41)	5(44)
Qatar	0(53)	0(56)	0(58)	4(42)	6(41)	6(41)	9(38)
Cayman Islands	5(37)	5(38)	5(38)	4(42)	3(44)	2(49)	0(63)
Egypt	1(46)	3(41)	3(43)	3(46)	3(44)	5(44)	4(45)
Colombia	0(53)	2(44)	2(44)	2(47)	3(44)	3(45)	6(42)
Philippines	2(41)	1(47)	1(49)	2(47)	3(44)	3(45)	4(45)
Hungary	2(41)	2(44)	2(44)	2(47)	2(50)	2(49)	2(49)
Iceland	3(40)	3(41)	4(40)	4(42)	0(63)	0(63)	0(63)
Venezuela	0(53)	1(47)	2(44)	2(47)	2(50)	3(45)	4(45)
Pakistan	2(41)	2(44)	2(44)	2(47)	2(50)	1(57)	2(49)
Morocco	0(53)	1(47)	1(49)	2(47)	3(44)	2(49)	3(48)
Panama	1(46)	1(47)	2(44)	2(47)	2(50)	2(49)	1(54)
Peru	1(46)	0(56)	1(49)	2(47)	2(50)	3(45)	2(49)
Jordan	1(46)	1(47)	1(49)	1(57)	2(50)	2(49)	1(54)
Bahrain	0(53)	0(56)	0(58)	2(47)	2(50)	2(49)	2(49)
Czech Republic	2(41)	1(47)	1(49)	1(57)	1(59)	1(57)	1(54)
Liberia	1(46)	1(47)	1(49)	1(57)	1(59)	1(57)	1(54)
New Zealand	1(46)	1(47)	1(49)	2(47)	2(50)	0(63)	0(63)
Nigeria	0(53)	0(56)	0(58)	0(61)	3(44)	1(57)	1(54)
Kazakhstan	0(53)	0(56)	0(58)	0(61)	1(59)	2(49)	1(54)
Lebanon	0(53)	0(56)	0(58)	0(61)	0(63)	2(49)	2(49)
Bahamas	1(46)	1(47)	1(49)	0(61)	0(63)	0(63)	0(63)
Liechtenstein	0(53)	0(56)	0(58)	0(61)	1(59)	1(57)	1(54)
Oman	0(53)	0(56)	0(58)	0(61)	0(63)	1(57)	1(54)
Papua New Guinea	0(53)	0(56)	0(58)	0(61)	2(50)	0(63)	0(63)
Argentina	0(53)	0(56)	1(49)	0(61)	0(63)	0(63)	0(63)
Channel Islands	0(53)	0(56)	0(58)	1(57)	0(63)	0(63)	0(63)
Croatia	0(53)	0(56)	0(58)	0(61)	0(63)	0(63)	1(54)

*Source:* Forbes Global 2000.

**Figure 1. GDP and Total Firm Numbers in the Forbes Global 2000 across Countries (2010).**



Source: UNCTAD and WDI. Note: Right axis represents GDP and left means firm number.



**Table 7. The Results of Hausman Test.**

. hausman Bnch\_fe Bnch\_re

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) Bnch_fe	(B) Bnch_re		
gdp	.7738796	1.464127	-.6902473	.0383839
gnipc	4.340975	3.547625	.7933503	2.118303
fdi_st_in	2.215253	3.561091	-1.345838	.0592517
fdi_st_out	1.455122	1.398907	.0562145	.
timetrd	.0555277	.036633	.0188947	.0018258
fdi_sin_t	.0600005	-.2175394	.2775399	.0052107
fdi_sou_t	-.5440646	-.4227965	-.121268	.

b = consistent under Ho and Ha; obtained from xtreg  
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(7) = (b-B)'[(V\_b-V\_B)^(-1)](b-B)  
 = 576.65  
 Prob>chi2 = 0.0000  
 (V\_b-V\_B is not positive definite)

**Table 8: List of Variables.**

<b>Variables</b>	<b>Notations</b>	<b>Expected Signs</b>	<b>Description</b>
Year	<i>t</i>		Totally seven years, from 2004 to 2010.
Country	<i>dCty</i>	+ or -	Forty eight countries, listed in Table 2. Some of these variables are for testing the effect of evolution of economic development, and the effect of state capitalism.
Industry	<i>dInd</i>		Sixteen industries, listed in Table 1. Other than the panel variables, this variable is usually multiplied to other variables to verify the industry-specific effects.
Firm number	<i>Firmnum</i>		Dependent variables. The number of Forbes Global 2000 firms a country owns in a given industry in a given year.
GDP	<i>GDP</i>	+	The gross domestic product of a country in a given year. This variable is for testing the home market effect.
GNI per capita	<i>GNIPC</i>		The gross national income per capita of a country in a given year.
Inward FDI stock	<i>InFDI</i>	+	The stock of the FDI flowing into a country in a given year. This variable is for testing the inward multinational firm effect.
Outward FDI stock	<i>OutFDI</i>	+	The stock of the FDI flowing out of a country in a given year. This variable is for testing the outward multinational firm effect.
Time trend	<i>Timetrd</i>	+ or -	We set a series of 1 to 7 for the years from 2004 to 2010, respectively.
Group	<i>dGrp</i>	+ or -	Four groups: the NIEs, emerging Tigers, NAFTA without the U.S., and colonizing countries without the U.K.

**Table 9. The Results of Unit Root Tests.**

Variables	Levin, Lin and Chu (LLC)	Harris-Tzavalis (HT)	Im, Pesaran and Shin (IPS)	Breitung
<i>Firmnum</i>	0.4752 (0.6827)	-1.0266 (0.1523)	. (.)	-3.3175* (0.0005)
<i>GDP</i>	-21.5269* (0.0000)	19.3816 (1.0000)	16.6509 (1.0000)	19.2296 (1.0000)
<i>GNIPC</i>	-14.4336* (0.0000)	-5.1804* (0.0000)	. (.)	28.5103 (1.0000)
<i>InFDI</i>	-26.1896* (0.0000)	-27.9747* (0.0000)	19.3214 (1.0000)	20.7566 (1.0000)
<i>OutFDI</i>	-40.0697* (0.0000)	-37.6728* (0.0000)	31.9036 (1.0000)	28.0910 (1.0000)

*Source:* Organized from STATA report by the authors.

*Note:* The value of LLC test is the adjusted t-value; is z-value for HT test; is z-t-tilde value for IPS test; is lamda statistics for Breitung test. The values in parentheses for all tests are all p-values. The asterisk symbol means the null hypothesis is significantly rejected, indicating no problem of unit root.

**Table 10: Benchmark Model and Industry-Specific Home Market Effect.**

Dep: Firm number	Model 1	Model 2
GDP	0.774***	0.422*
Inward FDI stock	2.215***	2.215***
Outward FDI stock	1.455***	1.455***
Time trend	0.056***	0.056***
InFD_Time trend	0.060	0.060
OutFDI_Time trend	-0.544***	-0.544***
GNI per capita	4.341	4.341
GDP_Bank		-0.154
GDP_Cpgd		1.866***
GDP_Comm		-0.105
GDP_Cnst		0.447
GDP_Csgd		1.028***
GDP_Cssv		-0.919***
GDP_Divf		1.681***
GDP_Insr		-0.412
GDP_Imgd		-0.514
GDP_Mkch		-1.076***
GDP_Mtrl		3.043***
GDP_Olgs		0.867***
GDP_Pdsv		-0.492
GDP_Tnsp		0.443
GDP_Ultt		-0.072
Cons	1.025***	1.025***

Note: \*, \*\*, \*\*\*: Significant at 0.01, 0.05, 0.10 levels.

**Table 11: Industry-Specific Multinational Firm Effect.**

Dep: Firm number	Model 1	Model 3
GDP	0.774***	0.744***
Inward FDI stock	2.215***	-1.442
Outward FDI stock	1.455***	3.659***
Time trend	0.056***	0.056***
InFD_Time trend	0.060	0.060
OutFDI_Time trend	-0.544***	-0.544***
GNI per capita	4.341	4.341
InFD _Bank		8.023***
InFD _Cpgd		5.586***
InFD _Comm		-1.027
InFD _Cnst		2.685
InFD _Csgd		6.753***
InFD _Cssv		3.365*
InFD _Divf		9.248***
InFD _Insr		2.439
InFD _Imgd		3.295*
InFD _Mkch		4.745**
InFD _Mtrl		5.316***
InFD _Olgs		-0.399
InFD _Pdsv		3.203*
InFD _Tnsp		0.497
InFD _Utlt		4.803**
OutFDI _Bank		-5.812***
OutFDI _Cpgd		-2.663*
OutFDI _Comm		0.407
OutFDI _Cnst		-1.720
OutFDI _Csgd		-5.859***
OutFDI _Cssv		-3.412**
OutFDI _Divf		-3.717***
OutFDI _Insr		-0.756
OutFDI _Imgd		-2.480*
OutFDI _Mkch		-4.785***
OutFDI _Mtrl		-1.419
OutFDI _Olgs		3.596***
OutFDI _Pdsv		-2.278*
OutFDI _Tnsp		-0.476
OutFDI _Utlt		-3.888***
Cons	1.025***	1.025***

Note: \*, \*\*, \*\*\*: Significant at 0.01, 0.05, 0.10 levels.

**Table 12: Effects of Evolution of Economic Development and State Capitalism**

<b>Dep: Firm number</b>	<b>Model 4</b>	<b>Model 5</b>
GDP	0.367*	0.491***
GNI per capita	-3.914	-8.120
Inward FDI stock	1.635**	0.951
Outward FDI stock	-1.248**	-0.180
Time trend	-0.001	0.011
InFD_Time trend	-0.288*	-0.006
OutFDI_Time trend	0.350***	0.014
Timetrend_TAWN	0.031	
Timetrend_HNKG	0.068	
Timetrend_SGAP	0.062	
Timetrend_SKOR	0.149**	
Timetrend_INDO	0.025	
Timetrend_MYSA	0.060	
Timetrend_PHIL	0.024	
Timetrend_THAL	0.032	
Timetrend_CHNA	0.930***	0.765***
Timetrend_UKIN	-0.822***	-0.598***
Timetrend_PROT	0.021	
Timetrend_SPAN	-0.099	
Timetrend_FRNE	-0.224**	
Timetrend_BRAZ	0.142*	
Timetrend_RUSS	0.078	
Timetrend_INDA	0.256***	
Timetrend_USAS	-2.872***	-2.410***
Timetrend_JPAN	-0.908***	-0.768***
Timetrend_CAND	-0.100	
Timetrend_GERM	-0.374***	
Timetrend_NETH	-0.204***	
Timetrend_MEXI	0.045	
Timetrend_NIES		0.056*
Timetrend_TIGR		0.006
Timetrend_NACM		-0.055
Timetrend_CLUK		-0.060*
Cons	2.377***	2.231***

*Note:* \*, \*\*, \*\*\*: Significant at 0.01, 0.05, 0.10 levels.

Works to do:

1. 是否需考慮金融危機前後之不同？ In the observation period of 2005-11 in our data set, the most influential event affecting the world economy is the Global Financial Crisis in 2008.

Ans: (considered: 20120811)

2. Forbes Global 2000 = FG2000 = FG2K?

Ans: G2K?

3. 是否可以用國企數量（佔某某比例？）衡量國家資本主義？

Ans: Hard.

4. Consider IRTS proxy?

Ans: No. We just argue that industries with positive HME might indicate their sufficient IRTS property and transportation costs.

5. HYS: Resources, Regional development, HME, History

HYSS: HME, FDI, Evolution of economic development, State capitalism

Ans:

#### **HYSS**

HME → IRTS + transport cost = HME; (*HYS's HME*)

IRTS → large firms → market size expands → more large firms

FDI → multinationals make FDIs (incorporate *HYS's Resources*)

Evolution (*HYS's History*)

→ 1. GNI per capita (*HMY's Regional development*)

2. Country/Region: nature of industry (property of products

innovation: destructive(ITC)/incremental(cars and conventional))

Emerging countries catch up advanced countries easily in ITC.

State capitalism

6. Stylized facts: industry wide analysis?

And: Done.