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Industrial policy for growth Kristine Farla

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**AFD-MGSoG/UNU-Merit Working Paper Series on
« Institutions, Governance and Long term Growth »**

In 2010, the French Development Agency (AFD) initiated a partnership with the Maastricht Graduate School of Governance (Maastricht University - UNU-Merit) with a view to exploring the conceptual and econometric relationships between institutions and long-term growth. As a development bank with a long-term lending horizon, AFD is particularly interested in better understanding the determinants of countries' long term economic, social, and political trajectory.

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- (ii) Testing the econometric relationship between institutional measures and long term growth;
- (iii) Exploring through a series of country case studies the historical relationship between processes of economic accumulation, forms of political organisation, and social cohesion;
- (iv) Discussing conceptual frameworks for making sense of the interaction between political, social and economic forces in the process of development;
- (v) Developing methodologies for political economy analyses.

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Industrial Policy for Growth*

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Abstract

This study investigates the extent to which countries' industrial policy package is successful in stimulating growth. We use perception based data for 59 countries that covers 22 policy aspects and seek to unbundle different dimensions of industrial policy. Using principal component analysis we distinguish between industrial policy that stimulates industry development, 'pro-business' policy, and industrial policy that promotes the development of free markets, 'pro-market' policy. We find that there is a positive relation between these policies which suggests that at the macro level there is no trade-off between the implementation of these two policy types. Furthermore, fixed effect analysis suggests that pro-business policy has a positive effect on growth but not on income. We find no clear relation between pro-market policy and economic development. Finally, we assess the effect of innovation and technology policy on economic performance using a subset of the pro-business type variables. We find that such policy is positively related to both growth and income.

Keywords: Industrial Policy, Growth, Competition, Innovation

JEL Classification: L50, O11, O25, O43

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1 Introduction

Followers of neoliberal theory believe in the efficient and self-organizing capacity of free markets to the extent that market liberalization, deregulation, openness, and competition are key to growth. Policies that favor given sectors or industries are generally criticized for inducing firms to lose competitive drive and lower investment. More recently, [Aiginger \(2007\)](#) argues that in developed countries policy supporting specific sectors and industry has re-emerged. Similarly, [Peres \(2009\)](#) finds that, contrary to the conventional notion, Latin American countries have implemented more industrial policy in combination with an outward oriented policy approach. What is the benefit of the government taking on a more active role in terms of market intervention? To what extent is industrial policy aimed at supporting existing industry competitiveness and/or at supporting market competition and consumer protection? Do such policies effectively stimulate growth? The main contribution of this study is that, based on a broad understanding of industrial policy which encompasses e.g. competition policies, we use cross-country data to study the relation of countries' industrial policy package and growth.

Industrial policy is generally understood to refer to a mix of policies that support the structural transformation and development of a country's industry. Industrial policy covers a broad range of policies. For example, [Di Maio \(2009\)](#) describes industrial policy as including the following policies: innovation and technology, education and skills formation, trade, targeted industry support measures, competitiveness, and competition regulation. [Rodrik and Subramanian \(2005\)](#) distinguish between policy that targets the development of business—'pro-business' policy—and policy that targets the development of free markets—'pro-market' policy. The authors define pro-business policies as policies that support the development of existing industry and are "aimed primarily at benefiting incumbents in the formal industrial commercial sector" ([Rodrik and Subramanian, 2005](#), p. 215). Furthermore, the authors define pro-market policies as policies that are aimed at stimulating competition and benefit new entrants and consumers. [Rodrik and Subramanian](#) find that in India high levels of growth in the 1980's were triggered by pro-business rather than by pro-market policy.¹ Also, [Khan and Blankenburg \(2009\)](#) and [Acemoglu et al. \(2006\)](#) suggest that in the first stage of development industrial policy should focus on supporting industrial development and in the second stage industrial policy should stimulate competition.

The policy classification as offered by [Rodrik and Subramanian](#) is particularly useful for our analysis mainly because it allows for a de-facto distinction between policies rather than a de-jure distinction of policies. The distinction between pro-market and pro-business policy is similar to the policy contrast of market-oriented and structuralist policy but we assume that the focus of the former is on industrial policies and that the focus of the latter additionally extends into other policy areas.

We use cross-country data (on 59 countries) to empirically assess the extent to which there is a trade-off between the pro-market and pro-business policy types at the macro level. On the basis of perception-based policy data on industrial policy and principal component analysis we seek to differentiate between different aspects of policies that support business development and policies that support free markets. We find that it is possible to distinguish between pro-market and pro-business type policies

¹ [Rodrik and Subramanian \(2005\)](#) study the variation in political alliances between state governments and the Indian national government and interpret this as a proxy for an attitudinal shift toward pro-business policy.

and, on the basis of this categorization of data, we construct an indicator for each policy type. Contrary to the description of pro-market and pro-business policy that is proposed by [Rodrik and Subramanian \(2005\)](#), our policy measures do not specify which industries/actors are targeted by the policies. In particular, as a result of data limitations we cannot distinguish between policy that specifically targets incumbents and policy that specifically targets new market entrants. Our measures of pro-market and pro-business policy are positively correlated implying that at the macro-level there is no trade-off between the implementation of pro-market and pro-business type policy.

We analyze the relationship between countries' industrial policy and economic performance. Fixed-effects analysis using data from 1995-2009 and 56 countries suggests that pro-business policy is positively related to growth but not to per capita income. We find no clear effect of pro-market policy on economic performance. In the final section of this study we extend the analysis and focus specifically on the contrast between competition policy and innovation policy which several scholars (e.g. [Aiginger, 2007](#)) describe are key concepts in industrial policy. [Soete \(2007\)](#) emphasizes the importance of innovation policy and argues that industrial development is much dependent on strong policy stimulating innovative advances. According to [Soete](#), consumers and market take-up are lagging behind industry capacity in terms of green technologies; therefore there is a lack of incentive for further industrial development. Scholars have established a relation between innovation capacity and growth ([Fagerberg and Srholec, 2008](#)) but, overall, cross-country empirical evidence on the effect of innovation policy on growth is lacking. We measure innovation policy using a sub-set of indicators from our 'pro-business' policy indicator. We conclude that an industrial policy package which has a strong emphasis on supporting innovation and technological development is most successful in stimulating economic development because we find a relatively strong positive effect of innovation policy on growth as well as a small but nonetheless positive and significant effect on income.

2 Some Recent Trends in Industrial Policy

"Industrial policy is open to corruption and rent-seeking. Any system of incentives designed to help private investors venture into new activities can end up serving as a mechanism of rent transfer to unscrupulous businessman and self-interested bureaucrats" ([Rodrik et al., 2004](#), pp. 17). [North et al. \(2009\)](#) argue that elite distribute rents in order to maintain political stability and hence, elite prosperity. Both pro-market and pro-business type policy are (possible) sources of rent distribution. On the one hand, an absence of anti-competition policy could be an indication that the economic elite exercises pressure in order to secure industry dominance ([Acemoglu et al., 2006](#)). And, pro-business policy reforms have been used to gain political support from the private sector ([Rodrik and Subramanian, 2005](#)).² On the other hand, market liberalization and privatization have re-distributed large rents to elite under the pretext of market development ([Schamis, 2002](#)).

Industrial policy is heavily contested because industrial policy creates rent-seeking opportunities and is more rewarding to some individuals and firms ([Pack and Saggi,](#)

² In democratic countries, the political elite is arguably less influenced by rent-seeking. Yet, as a result of strong industrial representation and lobbying, to some degree in developed countries industrial policy also favours the dominant industry ([Acemoglu et al., 2013](#); [Breschi and Cusmano, 2004](#)).

2006). Most economists share the belief that policies should refrain from ‘picking winners’. Some economists view markets as self-regulating—developed countries are not in need of industrial policy, industrial policy should be largely non-existent. The neoliberal applications of the Washington consensus left little space for a generous industrial policy agenda (Cimoli et al., 2009a). As a result of the controversy around industrial policy, some governments downplay the role of the implemented policy mix, especially those policies that support particular industry. To some degree the term ‘industrial policy’ has been avoided altogether and replaced with new and less controversial terms such as ‘competitiveness policy’. Moreover, industrial policy has been subject to several reforms.

Ha-joon Chang (2002) extensively outlines that almost every ‘now-developed country’ used infant industry policy in order to catch-up on industrial development. Even after the Second World War several developed economies heavily protected infant industries using an interventionist approach (Aghion et al., 2012). In the 1980’s industrial policy shifted towards a policy-mix with a strong horizontal component (policy that does not favour specific sectors). For example, for the EU overall, this change implied giving up on policies that favoured specific sectors and industries and therefore generated an unfair competitive advantage in the common market (Aiginger and Sieber, 2006). In France this change implied that the previously large scale interventionist policies were remodeled (Cohen, 2007).

More recently, in developed countries the neoliberal approach to industrial policy is contrasted by several trends which suggest a re-emergence of industrial policy (Aiginger, 2007). First, since the onset of the financial crisis several governments have actively implemented policies that help ‘save’ industries and organizations (e.g. by means of bail-outs), combat unemployment, and generate fiscal stimulus. Second, the globalization of markets has emphasized the need to protect local industry and stimulate regional development. Third, as a result of structural changes in the economy, industrial policy has extended further into new industries. In particular, developments in industrial policy are organized more strategically along the lines of technology and innovation policy. In both the US and the European Union (EU) such policies are directed towards public private partnerships and research-industry cooperations, and regional clustering and specialization. In the EU, this ‘new’ type of industrial policy (i.e. implemented since 2005) has a strong horizontal component but the policy measures are tailored to specific sectors and industries of strategic importance (Zourek, 2007). This new approach is less extreme than both the previous ‘interventionist’ approach and neoliberal approach. Aiginger and Sieber (2006) has labeled this EC approach towards industrial policy as the ‘matrix approach’ (see also Aiginger, 2007) and Bianchi and Labory (2006) refers to this phase of EC industrial policy as ‘pragmatic’.

Industry restructuring, diversification, and upgrading remain key components for continuous industrial development. Developing countries have experimented with a range of industrial policies and combinations of policy. Some (East Asian) countries have acquired considerable success following a strategic export-oriented strategy in combination with infant industry protection (Hiley, 2000). In particular, Zhu (2007) studies industrial policy in Thailand and China and argues that both economies combined an import-substituting industrialization (ISI) strategy with an export-oriented industrialization (EOI) strategy when the economies shifted to export promotion; Taiwan since the 1960’s and China since the 1980’s. According to Zhu, the economic success of the economies is attributable to having implemented a combination of ISI and EOI strategies. Also other developing countries, under the agenda of import substitution,

have provided significant support for public and privately owned enterprises (Amsden, 2008). In particular in African countries, infant industry support policies have played an important role in providing continued support for industrial development (Tribe, 2000). However, Wade (2009) suggests that low income countries to have done too little to steer industrial development and argues that these economies require more rigorous industrial policies that support and protect industries.

Similar to the experience in Western Europe, Wade (2012) argues that developing countries are showing a renewed interest in reinforcing industrial policy, for example because of increased international competition. In the 1980's, the Washington consensus heavily promoted a neoliberal policy agenda in Latin American countries; this included extensive privatization and financial liberalization. And, in the 1990's, several Latin American countries moved away from this policy trend. Melo (2001) surveys industrial policies implemented in Latin America and the Caribbean with particular emphasis on the emergence of new policies in 1994—1996. The author finds that these policies “aim to improve the competitiveness of domestic producers in a new, increasingly integrated and open world economy” by means of explicit government intervention (Melo, 2001, pp. 7). Based on an overview of industrial policy in Latin America, Peres (2009) argues that since the 1980's industrial policy still continues to have a sectoral focus although the experience within Latin America differs. For example, Chile also relied on a horizontal policy framework approach and in Costa Rica, Peru, and Uruguay the government provided support for specific firms (Peres, 2009). Moreover, according to Peres, Brazil and Mexico created technology funds and other specific programmes to stimulate technological development following a sectoral focus. With emphasis on the policy toolbox intended to stimulate financial access in Latin America, (e.g. the public provision of market infrastructure, structured finance, credit guarantee systems, transaction cost subsidies, and public lending) De la Torre et al. (2007) differentiate between interventionist policy, laissez-faire policy, and an intermediate policy variant that specifically targets, in a more restricted manner, a set of policy interventions that addresses market failures and supports private sector development.³ De la Torre et al. find that several regional institutions are moving towards this policy direction.

3 Evidence and Theory on the Relation between Industrial Policy and Growth

There is no clear understanding on the type of industrial policy that is most effective in stimulating growth. Yet most scholars argue that, at least under certain conditions, policies that support business development are effective in stimulating growth. In this section we provide a brief overview of this literature.

Aghion et al. (2012) develop a theoretical model and an empirical analysis using data on firms located in China to test the effect of sectoral policies (tariffs, subsidies, and tax) and competition on productivity. The authors find that sectoral policies are successful in delivering growth when allocated to competitive sectors. Similarly, using data on firms located in the UK, Criscuolo et al. (2012) find a positive effect of investment subsidies on investment and employment. Acemoglu et al. (2013) are more skeptical

³ De la Torre et al. (2007) refer to this intermediate policy variant as ‘pro-market activism’. Despite this wording, this intermediate policy variant is rather different from the ‘pro-market’ type policy (i.e. that is described by Rodrik and Subramanian, 2005).

of the benefits of R&D subsidies on productivity growth. Using firm-level data from the US, the authors find a negative effect of subsidies allocated towards incumbents on productivity growth. Yet, the authors also find substantially higher growth when subsidies target both incumbents and new market entrants and, in addition, incumbents are (heavily) taxed. [Buigues and Sekkat \(2011\)](#) summarize additional empirical evidence on the effect of subsidies on firm performance and conclude that most studies suggest a positive relation of public support on R&D. However, [Buigues and Sekkat](#) find that the effect of public support on productivity is inconclusive. In a related theoretical study [Acemoglu et al. \(2006\)](#) show that low competition may have negative long-run effects and may prevent catch-up. [Acemoglu et al.](#) also show that countries at early stages of development may benefit from anticompetitive policy that protects or supports incumbent industry development and, as a result, may experience faster growth and technological convergence.

Aside from the work of [Rodrik and Subramanian \(2005\)](#), several additional country-case studies conclude that industry support generates growth. [Gerschenkron \(1962\)](#) already proposed that government and banks' support towards business helped 'backward' economies in the nineteenth century to catch-up. This view is, for example, also shared by [Cimoli et al. \(2009b\)](#). [Lee \(2011\)](#) argues that, in Korea in the 1970's, infant industry protection resulted in industrial growth. Similarly, [Khan \(2008, p. 57\)](#) argues that, in Pakistan, "protection and subsidies proved to be extremely effective in driving investment in sectors that had previously been neglected", and "import substitution, as a method of developing new capabilities, was initially extremely successful in both India and Pakistan." Similar to the work of [Rodrik and Subramanian](#), [Khan and Blankenburg \(2009\)](#) likewise distinguish between two industrial policy groups: strong and targeted policy and weak and horizontal policy. The first group comprises policies that target firms or sectors to enable these to become competitive. The second group comprises policies that sustain productivity in competitive markets and thereby discourage permanent rent-seeking behaviour.

Building on the argument of [Khan and Blankenburg \(2009\)](#), a possible scenario is that countries' policy emphasis shifts from strong industry support to weak horizontal support as industrial development catches up. According to [Khan and Blankenburg \(2009\)](#), the first stage of industrial development requires pro-business type policies that protect the incumbent industries' knowledge acquisition. The second phase of industry development requires pro-market type policies that increase market competition with the aim to spread innovation and technology and set-off a Schumpeterian process of creative destruction ([Khan and Blankenburg, 2009](#)). [Possas and Borges \(2009\)](#) find that competition policy is only enforced gradually. [Bianchi and Labory \(2006\)](#) provide an overview of industrial policy in 8 countries (Italy, France, Germany, UK, Japan, Korea, Taiwan, and Singapore) and argue that in the phase of industrialization and at different phases of industrial restructuring these countries implemented relatively more protectionist and interventionist policy. But, from the 1980's these countries adopted more liberal policies. This is related to the progress made under WTO law, community law, and other trade agreements which altogether has resulted in a more limited implementation of policy instruments such as trade subsidies ([Aiginger, 2007](#)).

If industrial development is steered by the sequential implementation of pro-business and pro-market policy, at the macro level—or possibly at the industry level—there may be a trade-off between these policies. Indeed, [Rodrik and Subramanian \(2005\)](#) describe pro-market and pro-business policy as opposing policy packages. On the one hand, this

trade-off would imply that the degree of industry maturity determines whether to invoke either pro-business and pro-market type policies. In developing countries with a relatively weak institutional setting pro-business policies, including infant-industry protection, may play a relatively important role as a temporary short-run solution to market failure (Wade, 2012). Furthermore, scholars such as Greenwald and Stiglitz (2006) challenge conventional theory that trade generates growth and argue that restricting trade can be beneficial for technological spillovers, industrial development and growth. On the other hand, pro-business and pro-market policy may be inherently opposing to the extent that implementing both at the same time will cause the effectiveness of either policy to dwindle. Based on a study of Belgium firms, Buts and Jegers (2013) find a positive relation between subsidies (i.e. grants intended for investment in fixed assets) and firms' market share; this result implies that subsidies distort competition.

To what extent does the thesis of the sequential implementation of (a) pro-business policy and (b) pro-market policy and that of a possible policy trade-off contradict the re-emergence of industrial policy that targets industrial development as is witnessed in developed and some developing countries today? Valila (2006), who analyzes industrial policy using a more restricted definition, argues that the objectives of industrial policy are in conflict with the objectives of competition and trade policy. However, the author also argues that in practice conflict does not need to materialize, e.g. as in the case of pure horizontal policy. Likewise (Aiginger, 2007) argues that only the 'old' EU industrial policy conflicted with competition policy but the 'new' industrial policy does not i.e. as a result of increased transparency, tendering and cooperation. These view is also shared by Possas and Borges (2009, pp. 461) who specifically focus on competitions policy (as an integral part of industrial policy) and argue that "the potential conflict between industrial policies and competition policies tends to fade away in relatively advanced developing-but-industrialized countries because in such countries industrial policy focuses on competitiveness and technological development". One possibility is that, on average, in countries with a low industrial development pro-business type policies are implemented relatively more than pro-market type policies. In addition, possibly, pro-business type policies remain important in industrialized countries and, in these countries, these policies do not oppose pro-market type policies.

4 Industrial Policy Indicators

We are interested in policy data that covers a broad range of industrial policy aspects. This objective is particular challenging for several reasons. First, comprehensive indicators on industrial policies are lacking. For this reason, several scholars restrict their empirical analysis of industrial policy to one dimension (e.g. Bianchi and Labory, 2006). Second, 'hard' data on industrial policy lacks cross-country comparison because the definition and industrial policy measure are country (and industry) specific. For example, Buigues and Sekkat (2011) emphasize the difference in the measurement of subsidies across the OECD. Moreover, according to Livesey (2012) the framework of analysis of industrial policy in both developing and developed countries must be broad enough to capture the effect of (1) policies that target different industrial stages, (2) horizontal and vertical policy, (3) policy targeting firms of different sizes, and (4) policies

for structural change and policies stimulating industrial upgrading.⁴ These challenges contribute to explain why empirical evidence on the effect of different industrial policy on growth is lacking.

With the ambition to distinguish between pro-business and pro-market policy we rely on perception-based data that allows for a broad cross-country comparison of policies. We use survey data from the IMD World Competitiveness Yearbook (IMD), hereafter referred to as WCY, because the data has a broad range of variables that describe policy that targets the private sector. We use a selection of 22 policy variables; these variables are listed in Table 1.⁵ The WCY survey data covers 59 countries and includes data for the years 1995-2011. However, the WCY did not systematically conduct surveys in all countries for all years and therefore there are several missing observations in the data. The countries included in the WCY dataset are listed in Table 8 in the appendix.

Table 1: WCY 1995-2011

Pro-business Development Policy

Exchange: Exchange rates support the competitiveness of enterprises (1997-2011)
 Research: Laws relating to scientific research do encourage innovation (2004-2011)
 Regulation: Technological regulation supports business development and innovation (2005-2011)
 Funding: Funding for technological development is readily available (1995-2011)
 Ventures: Public and private sector ventures are supporting technological development (2007-2011)
 Legal: Development and application of technology are supported by the legal environment (1997-2011)
 Labour: Labour regulations (hiring/firing practices, minimum wages, etc.) do not hinder business activities (1995-2011)
 Creation: Creation of firms is supported by legislation (2002-2011)
 Ease: Ease of doing business is supported by regulations (2003-2011)
 Framework: The legal and regulatory framework encourages the competitiveness of enterprises (1997-2011)
 Tax: Real corporate taxes do not discourage entrepreneurial activity (1997-2011)
 Environment: Environmental laws and compliance do not hinder the competitiveness of businesses (1995-2011)

Pro-Market Development Policy

Immigration: Immigration laws do not prevent your company from employing foreign labor (1995-2011)
 Competition: Competition legislation is efficient in preventing unfair competition (1995-2011)
 Ownership: State ownership of enterprises is not a threat to business activities (2007-2011)
 Subsidies: Subsidies do not distort fair competition and economic development (2003-2011)
 Incentive: Investment incentives are attractive to foreign investors (2007-2011)

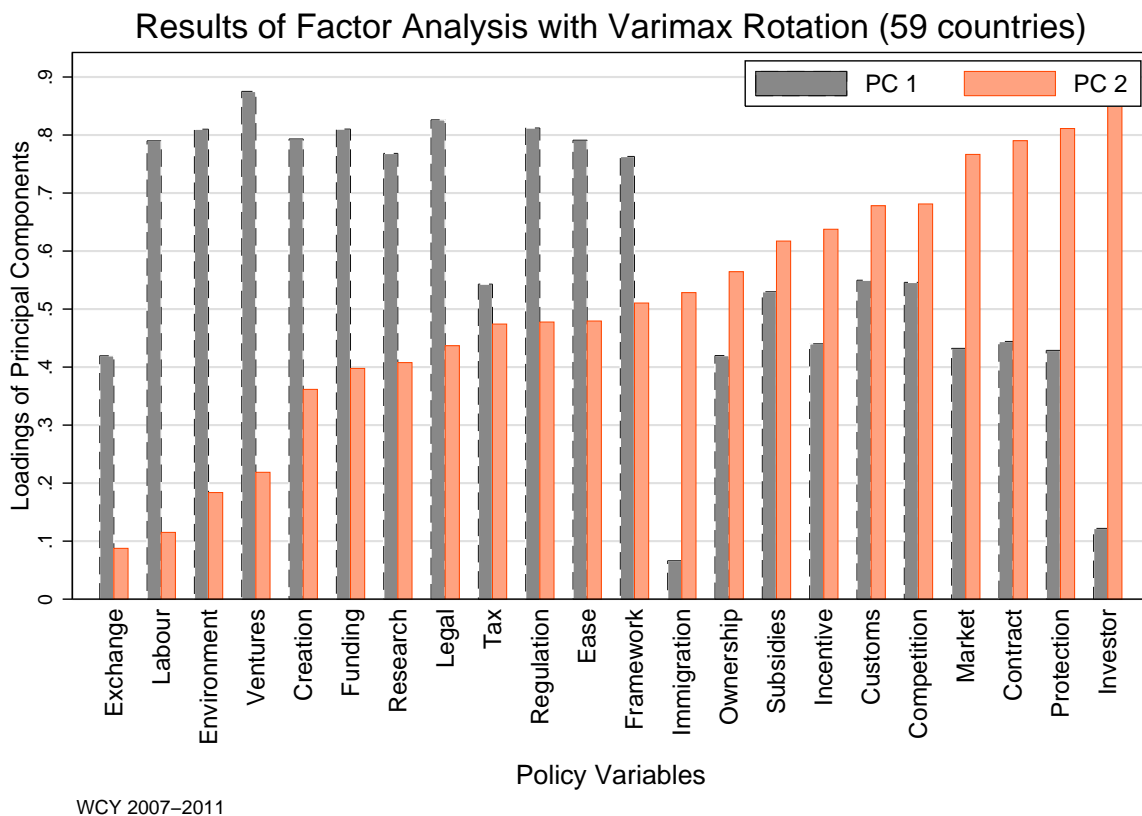
⁴ Livesey (2012) propose a meso-level framework approach that outlines specific industry comparative maturity. This specific approach can not be applied within the macro context.

⁵ The WCY survey data is collected with the intention to describe the degree of competitiveness of countries. The WCY survey is sent to executives working in a range of sectors. The sample size of each country is proportional to the countries' GDP. Data is collected during the period January to April. In 2011, the WCY collected 4,935 surveys (IMD, 2011). Survey respondents are asked to make a country assessment on the basis of a scale of 1 to 6. The WCY presents the average country score per variable on a scale of 0 to 10, where 10 is associated with high competitiveness.

Market: Capital markets (foreign and domestic) are easily accessible (2004-2011)
Investor: Foreign investors are free to acquire control in domestic companies (1995-2011)
Contract: Public sector contracts are sufficiently open to foreign bidders (1995-2011)
Protection: Protectionism does not impair the conduct of your business (1995-2011)
Customs: Customs' authorities do facilitate the efficient transit of goods (1997-2011)

We analyze the selection of WCY policy data with the intention to identify a pattern for the pro-business and/or pro-market type policy variables. This analysis is done on the basis of principal component analysis (PCA). A PCA is run on the WCY policy indicators for the years 2007-2011, and two principal components (PCs) are retained. We retain two PCs because we are interested in identifying two policy domains. For the PCA we rely on data from 2007-2011 because prior years contain more missing observations. For the years 2007-2011, the following countries have missing observations for one or more years: United Arab Emirates for 2007-2010, Peru for 2007, Iceland for 2009, Kazakhstan for 2007, and Qatar for 2007-2008.⁶ In order to facilitate the interpretation of the PCs, the PCs are rotated using varimax rotation which computes orthogonal factors. The first PC contains 40% of the total variation, and the second PC contains 30% of the total variation. The loadings of the PCA are presented in Figure 1.

Figure 1: Analysis of Policy Indicators: loadings of PCA



PC 1 loads high on the variables Labour, Environment, Ventures, Creation, Funding, Research, Legal, Tax, Ease, and Regulation. This PC also loads relatively high on

⁶ The total number of observations used in the PCA is 286.

the variables Framework and Exchange in comparison to the loadings of PC 2. PC 1 loads high on policy variables that support technological advancement and knowledge accumulation. PC 1 loads strongly on variables that describe the ease of access to funds to finance research and technological development. PC 1 also loads strongly on variables that support the existing industry competitiveness and development. These policies support industry that otherwise may be under-invested. PC 1 is related to the concept of pro-business policy (Rodrik and Subramanian, 2005) and strong and targeted policy (Khan and Blankenburg, 2009). However, unlike the industrial policy definition proposed by Rodrik and Subramanian, this measure of industrial policy does not specify incumbents as the industry target.⁷

PC 2 loads high on the variables Subsidies, Competition, Customs, Market, Investor, Contract, and Protection. Moreover, the loadings of the variables Ownership, Incentive and Immigration are relatively higher for PC 2 than for PC 1. PC 2 summarizes a group of variables that describe market liberalization, competition policy and deregulation. PC 2 describes regulations that are aimed at stimulating a free market economy. PC 2 can be considered a proxy for the following concepts: pro-market policy (Rodrik and Subramanian, 2005) and weak and horizontal policy (Khan and Blankenburg, 2009).⁸

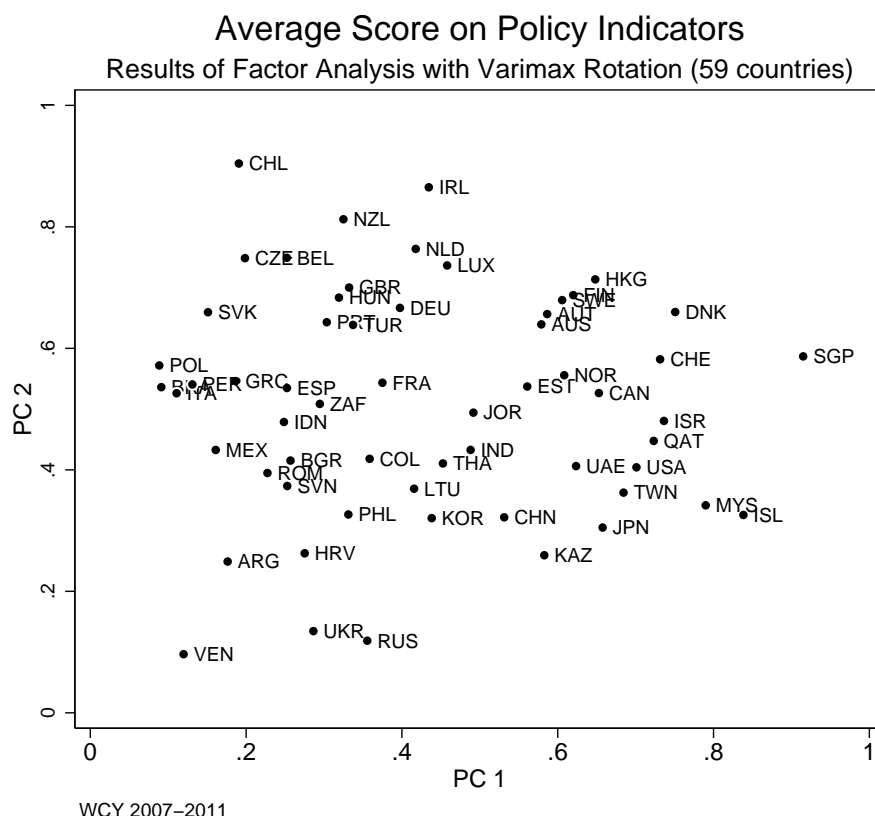
Figure 2 presents a scatter plot of PC 1 and PC 2.⁹ The scatter plot gives a first indication of the extent to which a country scores relatively higher on pro-business policy rather than on pro-market policy. For example, Malaysia, Iceland, and Singapore score relatively higher on PC 1. Chile, New Zealand, and Ireland score relatively higher on PC 2.

⁷ The WCY data is limited in the sense that it does not have any indicators of the degree to which policy favours either incumbents or new market entrants.

⁸ In Appendix 8.1 we test the validity of this categorization of policies using external data.

⁹ The PCs are normalized on a scale of 0 to 1.

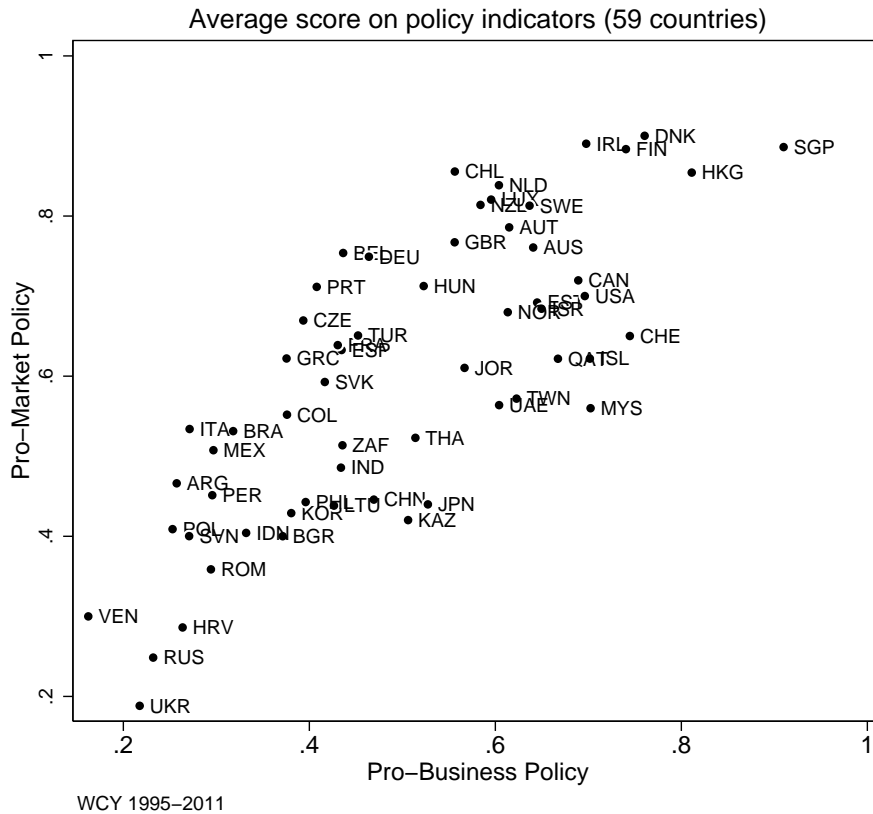
Figure 2: Analysis of Varimax Rotated Policy Indicators



The orthogonality of these indicators inhibits their comparability with alternative indicators and does not allow for the study of countries' 'natural' scores. Moreover, we are interested in studying the policy data for the years 1995-2011. In particular, on the basis of the orthogonal indicators we cannot identify if there is a trade-off between the implementation of pro-business and pro-market type policy. Therefore, the results from the PCA with varimax rotation are used to separate the policy variables into two policy domains: pro-market and pro-business. Variables are identified as pro-market when they load relatively higher on PC2 and variables are identified as pro-business when they load relatively higher on PC1 (see Figure 1). We calculate the average score of the pro-market policy variables and of the pro-business policy variables for each country and year; missing values are ignored. Finally, the indicators are normalized on a scale of 0 to 1, where 1 is associated with more implementation of pro-market and pro-business policy. Hereafter, these indicators are referred to as *Pro-market* and *Pro-business*. Thus, the motivation for creating the *Pro-market* and *Pro-business* indicators is inspired by the conceptual framework of [Rodrik and Subramanian](#) and [Khan and Blankenburg](#) and the categorization of the underlying variables is made on the basis of exploratory empirical analysis.

The average scores over time of the resulting policy indicators are illustrated in Figure 3. Whereas Figure 2, as previously discussed, shows the relation between orthogonal policy indicators, Figure 3 shows the relation between non-orthogonal policy indicators.

Figure 3: Analysis of Non-rotated Policy Indicators



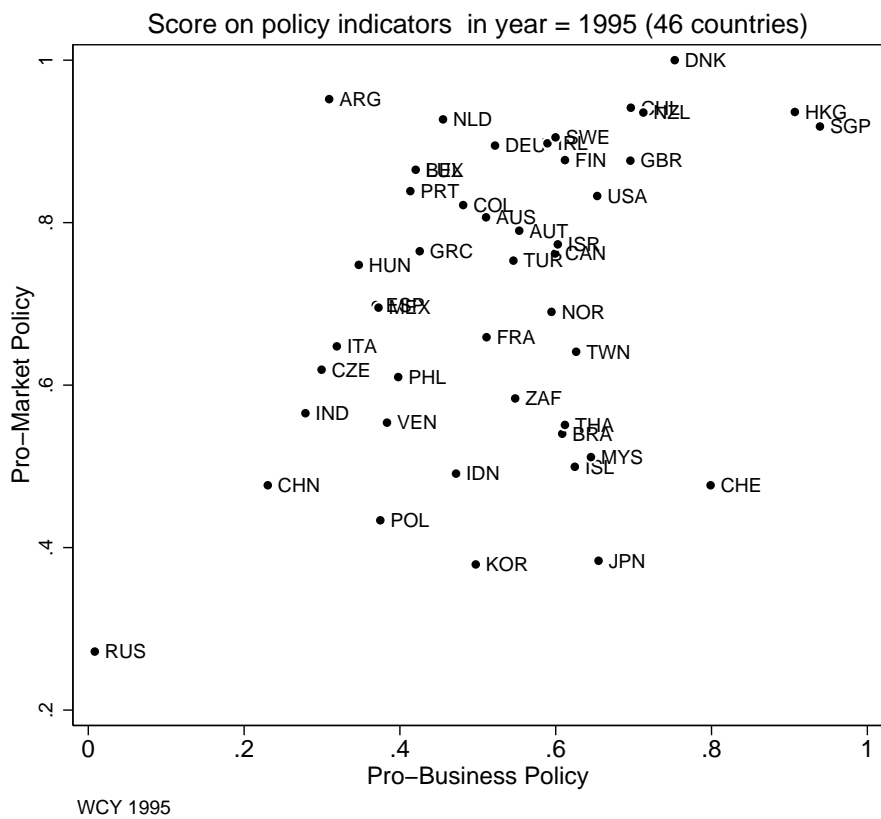
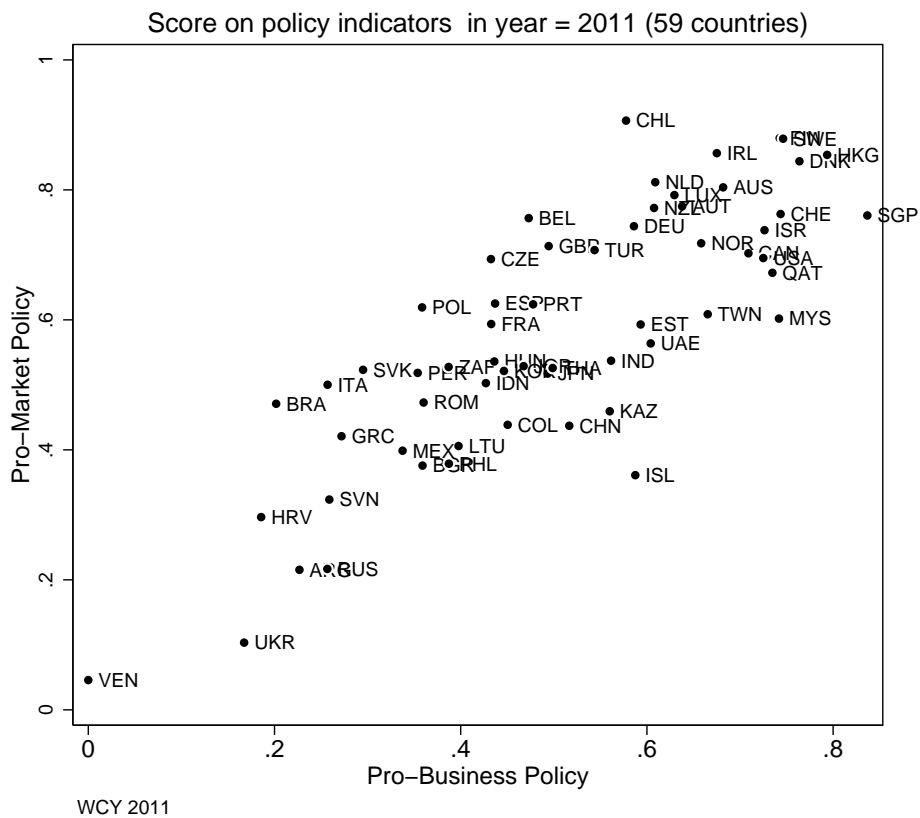
Following Figure 3, *Pro-market* and *Pro-business* policy appear to be positively correlated. We find no evidence that, on average, at the macro-level countries that are in a catch-up stage implement relatively more pro-business policies.¹⁰ Instead, Figure 3 suggests that pro-market and pro-business policies are complementary.¹¹

The first scatter plot illustrated in Figure 4 shows countries' scores on the policy indicators in 2011. Likewise, as in Figure 3, *Pro-market* and *Pro-business* policy have a strong linear relation. The correlation between these indicators in this year is 0.82. The second scatter plot in Figure 4 illustrates the association between *Pro-market* and *Pro-business* policy for the year 1995. The correlation between the *Pro-market* and *Pro-business* indicators in year 1995 is 0.38. This scatter plot illustrates that in 1995 the countries in the lower-right corner, e.g. Japan, Malaysia, Korea, Switzerland, and Brazil, had a stronger emphasis on pro-business policy than on pro-market policy. However, in 2011, this observation is no longer valid. In 1995, few countries scored high on the pro-business indicator. The overall dispersion of countries on the pro-business policy indicator is lower when using policy data from 1995 than when using policy data collected in 2011.

¹⁰ In the Appendix 8.2 we plot the relation between pro-business and pro-market policy using alternative data that covers a wider range of developing countries. This analysis confirms that of a positive relation between *Pro-market* and *Pro-business*.

¹¹ At the meso-level, when comparing across-industries, pro-business type policies may be more prominent in industries that are less mature and pro-market type policies may be relatively more enforced in mature industries.

Figure 4: Analysis of Policy Indicators over Time



5 Industrial Policy, Growth and Income

5.1 Model

The following fixed effect models are used to investigate the effect of pro-market and pro-business type policy on economic performance:

$$\begin{aligned} Income_{i,t} = & \beta_0 + \beta_1 Pro-market_{i,t} + \beta_2 Pro-business_{i,t} \\ & + \beta_3 Gconsumption_{i,t} + \beta_4 Openness_{i,t} + \beta_5 Investment_{i,t} \\ & + \beta_6 Education_{i,t} + \beta_7 Institutions_{i,t} + \epsilon_{i,t} \end{aligned} \quad (1)$$

$$\begin{aligned} Growth_{i,t} = & \beta_0 + \beta_1 Pro-market_{i,t} + \beta_2 Pro-business_{i,t} \\ & + \beta_3 Gconsumption_{i,t} + \beta_4 Openness_{i,t} + \beta_5 Investment_{i,t} \\ & + \beta_6 Education_{i,t} + \beta_7 Institutions_{i,t} + \beta_8 Income_{i,t-1} + \epsilon_{i,t} \end{aligned} \quad (2)$$

The dependent variable by which we measure economic performance takes the form of either *Income* (equation 1) or *Growth* (equation 2) in country i and year t . *Income* is measured using natural logarithm of real GDP per capita and *Growth* is measured as the average annual growth rate of real GDP per capita. β_1 - β_7 (equation 1) and β_1 - β_8 (equation 2) are the various parameters of interest and $\epsilon_{i,t}$ is a disturbance term which has the usual characteristics. Our main focus is on the estimation of β_1 and β_2 which we expect to be positive indicating that both pro-market and pro-business policy are successful in stimulating growth. The industrial policy types are measured using the average scores of the pro-market (*Pro-market*) and pro-business (*Pro-business*) variables from the WCY data for each country and year.

For both the growth and the income model (equation 1 and equation 2), we control for the effect of government consumption (*Gconsumption*), trade openness (*Openness*), level of investment (*Investment*), and for the average years of education for the country population aged 25 and above (*Education*).¹² Additionally, we control for a country's institutional development (*Institutions*) using two proxies: property rights protection (*Property*) and freedom from corruption (*Corruption*). We include these two indicators separately in the regression analysis. Recent literature has stressed the importance of institutions on growth (North et al., 2009; North, 1990) as well as the importance of institutions in influencing and constraining industrial policy (Rodrik, 2008; Rodrik et al., 2004). We expect the results to show that the sign of β_7 is positive indicating that institutional development (i.e. property rights protection and freedom from corruption) is positively related to economic performance. Finally, for the growth model (equation 2) we also control for the initial level of income using the log of real GDP per capita (*Income*).

Several of the pro-business indicators are related to government support for technological advancements and innovation. And, (as briefly explained in section 2) because innovation and technology policies have recently become a strong component of industrial policy in advanced economies we are interested in investigating the effect these policies on stimulating growth. On the basis of a conceptual approach we construct the indicator *Innovation* by computing the simple average of the variables Research, Regulation, Funding, Ventures, and Legal for each country and year. Hence, the indicator

¹² The definitions and sources of the control variables are given in Table 9 in the appendix.

Innovation is in fact a sub-set of the indicator *Pro-business*. Additionally, in order to test the robustness of the relation between pro-business type policy and economic performance, we construct the indicator, *Pro-business2*. *Pro-business2* is a simple average of the pro-business type variables for each year and country that are *not* related to innovation and technological development. The variables included in this indicator are the following: Exchange, Labour, Creation, Ease, Framework, Tax, and Environment. We will produce additional estimations where we replace the indicator *Pro-business* with the indicator *Innovation* and with the indicator *Pro-business2*.

We conclude the analysis by experimenting with the degree to which the effect of industrial policy on growth shows up with a one year delay. Hence, we modify equation 2 and produce estimations following equation 3.

$$\begin{aligned}
Growth_{i,t} = & \beta_0 + \beta_1 Pro-market_{i,t-1} + \beta_2 Pro-business_{i,t-1} \\
& + \beta_3 Gconsumption_{i,t} + \beta_4 Openness_{i,t} + \beta_5 Investment_{i,t} \\
& + \beta_6 Education_{i,t} + \beta_7 Institutions_{i,t} + \beta_8 Income_{i,t-1} + \epsilon_{i,t}
\end{aligned} \tag{3}$$

5.2 Descriptive Statistics

The growth and income models are estimated using an unbalanced dataset for the years 1995-2009 and 56 countries listed in Table 8 in the appendix.¹³ Iceland and Hong Kong are not included in the analysis because of missing data for the control variable *Education*. Moreover, there is no policy data for the United Arab Emirates for the years prior to 2010. Also, the data on institutions has additional missing observations for the year 1995 for the following countries: Belgium, Denmark, Finland, Luxembourg, Netherlands, Norway, New Zealand, and Switzerland.

The summary statistics are presented in Table 2. On average, countries score higher on pro-market than on pro-business policy. Also, on average countries score higher on *Property* than on *Corruption*. Moreover, the average growth rate is 2.5% but some countries experienced high negative growth rates and other countries experienced high positive growth rates. The correlations between the various variables are presented in Table 3. For this sample, the *Pro - market* and *Pro - business* indicators are correlated 0.71. The correlation between *Pro - market* and *Innovation* is 0.60. The correlation between the policy indicators and the institutional indicators is also high.¹⁴ The policy indicators have a low correlation with *Growth* and a positive and relatively high correlation with *Income*.

¹³ The macroeconomic controls have missing data for the years 2010-2011.

¹⁴ Despite these high correlations, variance inflation factors tests indicate no warning of multicollinearity.

Table 2: Summary Statistics

	MEAN	SD	MIN	MAX	N
Pro-market	0.63	0.20	0.00	1.00	715
Pro-business	0.50	0.18	0.00	1.00	715
Innovation	0.60	0.18	0.00	1.00	715
Pro-business2	0.52	0.17	0.00	1.00	715
Income	9.72	0.83	7.36	11.98	715
Growth	2.50	4.04	-17.27	20.41	715
Investment	24.32	6.35	9.31	51.37	715
Openness	86.51	64.03	17.95	443.18	715
Gconsumtion	8.74	2.97	2.58	18.91	715
Education	9.83	2.53	3.50	14.20	715
Property	0.71	0.23	0.00	1.00	715
Corruption	0.55	0.27	0.00	1.00	715

Data from 1995-2009

Policy indicators and institutional indicators are normalized on a scale from 0 to 1

Table 3: Pairwise Cross-Correlations

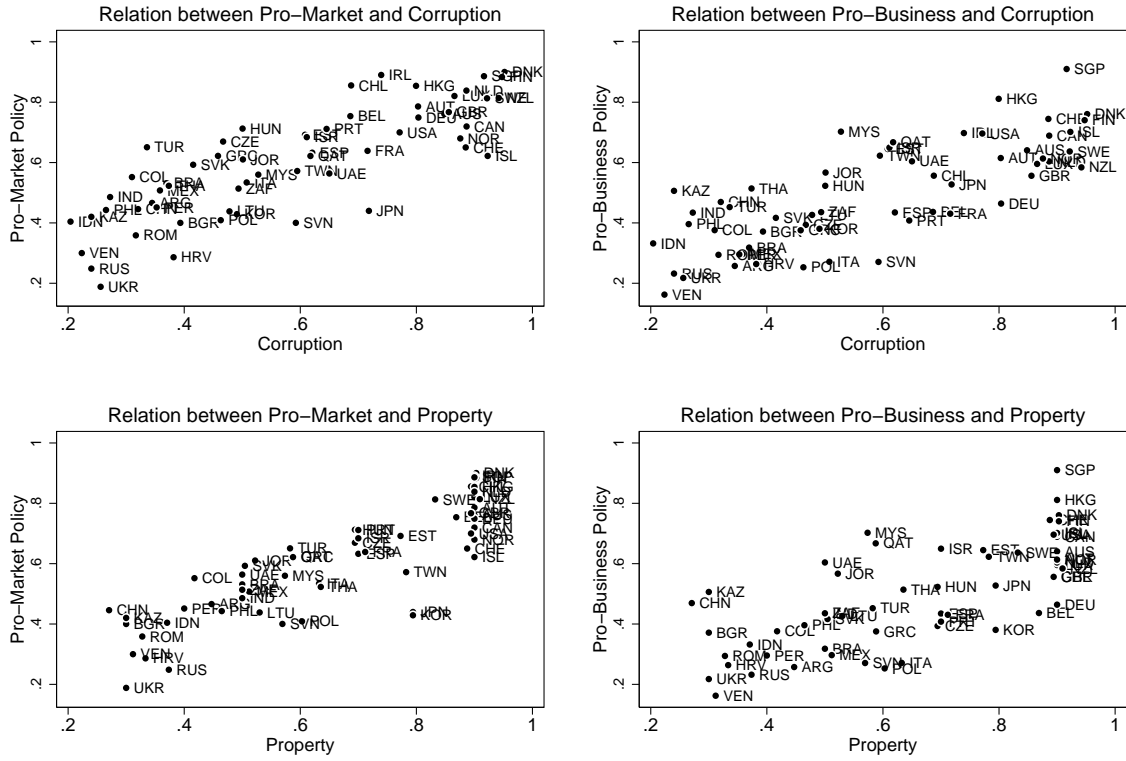
	Pro-market	Pro-business	Innovation	Pro-business2	Income	Growth	Investment	Openness	Gconsumtion	Education	Property	Corruption
Pro-market	1											
Pro-business	0.71	1										
Innovation	0.60	0.84	1									
Pro-business2	0.67	0.94	0.61	1								
Income	0.53	0.47	0.63	0.30	1							
Growth	-0.01	0.07	-0.01	0.11	-0.10	1						
Investment	-0.04	0.20	0.08	0.24	-0.07	0.31	1					
Openness	0.29	0.43	0.35	0.40	0.26	0.07	0.27	1				
Gconsumtion	0.14	0.12	0.15	0.09	0.13	0.10	0.03	-0.01	1			
Education	0.21	0.24	0.41	0.10	0.68	-0.10	-0.24	0.00	0.18	1		
Property	0.74	0.64	0.61	0.55	0.71	-0.14	-0.03	0.22	0.08	0.47	1	
Corruption	0.70	0.69	0.75	0.55	0.79	-0.10	-0.02	0.25	0.15	0.53	0.83	1

Data from 1995-2009

The scatter plots in Figure 5 provide a rough assessment of the relation between policy and countries' institutional development.¹⁵ Overall, we find that pro-market and pro-business policy has a positive and linear relation with property rights protection and control of corruption. As such, countries with a more developed and formalized institutional setting implement relatively more industrial policy. We find no evidence that governments implement relatively more pro-business policy to overcome market failure in countries with relatively weak institutions. On the contrary, the scatter plots suggest that countries' institutional setting plays an important role in defining a countries' policy space and hence, the implementation of a given policy package.

¹⁵ The property rights and corruption indicators are normalized on a scale of 0 to 1.

Figure 5: Institutions and Policy



WCY 1995–2011 and Heritage Foundation 1995–2011

5.3 Main Results

In this section, we present the results of fixed effects estimations that study the effect of pro-market and pro-business policy on growth and on income. Standard errors and (hence significance levels) are cluster-robust to simultaneous correlation across both country effects and year effects. This method of two-way clustering approach is based on the approach outlined by [Cameron et al. \(2011\)](#).

First, we investigate the effect of the coefficient of *Pro-market* and that of *Pro-business* on income and growth levels. Table 4 reports the results for the growth regressions and Table 5 reports the results for the income regressions. For both tables, the preferred models are models 3 and 6.¹⁶

In model 1 of Table 4 we include only the policy indicators. Here, we find a significant effect of the coefficient of *Pro-business* on growth and we find no effect of the coefficient of *Pro-market* on growth. In model 2 the macroeconomic controls are added to the model and as a result the coefficient of *Pro-business* changes moderately but remains significant and does not change sign. Nevertheless, the coefficient of *Pro-market* remains relatively close to zero and remains insignificant. Relative to the other covariates, the

¹⁶ On the basis of the parameters used in Table 4 model 3 and model 6 we compute Hausman tests of the difference between fixed effects (FE) and random effects (RE). The Hausman tests yield χ^2 values of 333.77 and 335.23 which are significant and thereby reject estimating using a RE model. The Hausman tests of the difference between FE and RE for the income models (3 and 6 of Table 5) fail to meet the asymptotic assumptions of the Hausman test.

coefficient of *Pro-business* is rather small in magnitude but unlike that of *Pro-market*, this coefficient is not close to zero. Following model 2, the estimated effect of a one standard deviation increase in pro-business policy leads to a 0.34 standard deviation increase in growth. As expected, the coefficients of *Investment* and *Education* are significant and positive. Likewise, the coefficient of *Openness* is significant and positive suggesting that more trade is related to higher growth levels. Government consumption has a negative effect on growth. And, the coefficient of *Income* is negative and significant and is relatively high in magnitude. In model 3 we control for the effect of *Property* and in model 6 we control for the effect of *Corruption*. After adding these additional covariates to the model we maintain that pro-business policy has a positive effect on growth. Contrary to expectations, the coefficient of *Property* is negative and significant and the coefficient of *Corruption* is negative but insignificant. In models 4, 5, 7, and 8 we experiment by estimating the effect of either *Pro-market* or *Pro-business* on growth. Based on this experimentation we find that when not controlling for *Pro-business* the coefficient of *Pro-market* remains insignificant and when not controlling for *Pro-market* the coefficient of *Pro-business* remains positive and significant.

Table 4: FE regression results: pro-market policy versus pro-business policy

	DEPENDENT VARIABLE: GROWTH							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pro-Market	-0.03 (0.93)	-0.08 (0.63)	-0.00 (0.98)	0.15 (0.21)		-0.09 (0.57)	0.09 (0.49)	
Pro-business	0.46** (0.01)	0.34* (0.04)	0.31* (0.05)		0.31** (0.01)	0.36* (0.02)		0.32** (0.00)
Investment		0.70*** (0.00)	0.74*** (0.00)	0.77*** (0.00)	0.74*** (0.00)	0.72*** (0.00)	0.75*** (0.00)	0.72*** (0.00)
Openness		1.41*** (0.00)	1.51*** (0.00)	1.58*** (0.00)	1.51*** (0.00)	1.41*** (0.00)	1.49*** (0.00)	1.39*** (0.00)
Gconsumption		-0.89* (0.02)	-0.88** (0.01)	-0.94** (0.01)	-0.88** (0.01)	-0.85* (0.03)	-0.93* (0.02)	-0.86* (0.03)
Education		2.36* (0.02)	1.61+ (0.08)	1.62+ (0.09)	1.62+ (0.08)	2.34* (0.02)	2.37* (0.03)	2.47* (0.02)
Income		-5.46*** (0.00)	-5.18*** (0.00)	-5.12** (0.00)	-5.18*** (0.00)	-5.42*** (0.00)	-5.37** (0.00)	-5.45*** (0.00)
Property			-0.68*** (0.00)	-0.70*** (0.00)	-0.68*** (0.00)			
Corruption						-0.20 (0.17)	-0.13 (0.38)	-0.19 (0.19)
<i>N</i>	715	715	715	715	715	715	715	715
<i>R</i> ²	0.04	0.39	0.43	0.42	0.43	0.39	0.37	0.39

Standardized beta coefficients; *p*-values in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In Table 5 we repeat the exercise using *Income* at the dependent variable. In the first step we again estimate the effect of *Pro-market* and *Pro-business* without controlling for the effect of additional covariates (model 1). Here we find a negative and significant effect of pro-market policy on income and a positive and significant effect of pro-business policy on income. However, these findings are not robust when adding the macro-economic and institutional controls. Based on models 2, 3, and 6 we find no effect of industrial policy on income. As for the models displayed in Table 4, following

the models displayed in Table 5 we find that the effect of *Investment*, *Openness*, and *Education* is significant and positive and that the effect of *Gconsumption* is significant and negative. We find no effect of institutions on income and the coefficients of *Property* and *Corruption* are close to zero.

Again, we explore whether the sign and significance of the coefficients of *pro-market* and *Pro-business* change when these covariates are entered separately in the model. These results are reported in models 4, 5, 7, and 8. We find that, when not controlling for the effect of pro-business policy on income, the estimated effect of pro-market policy on income is positive and significant. As such, it may be that not controlling for the effect of pro-business policy may cause researchers to wrongly conclude that pro-market policy has a positive effect on income. The coefficient of *Pro-business* remains insignificant in models 5 and 8.

Table 5: FE regression results: pro-market policy versus pro-business policy

	DEPENDENT VARIABLE: INCOME							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pro-Market	-0.15*** (0.00)	0.01 (0.31)	0.01 (0.27)	0.03* (0.05)		0.01 (0.29)	0.02+ (0.06)	
Pro-business	0.13** (0.00)	0.02 (0.27)	0.02 (0.28)		0.03 (0.12)	0.02 (0.25)		0.03 (0.11)
Investment		0.07*** (0.00)	0.07*** (0.00)	0.07*** (0.00)	0.07*** (0.00)	0.07*** (0.00)	0.07*** (0.00)	0.07*** (0.00)
Openness		0.17*** (0.00)	0.18*** (0.00)	0.18*** (0.00)	0.18*** (0.00)	0.17*** (0.00)	0.18*** (0.00)	0.18*** (0.00)
Gconsumption		-0.10* (0.03)	-0.10* (0.03)	-0.11* (0.02)	-0.10* (0.03)	-0.10* (0.03)	-0.11* (0.02)	-0.10* (0.03)
Education		0.59*** (0.00)	0.58*** (0.00)	0.59*** (0.00)	0.57*** (0.00)	0.59*** (0.00)	0.60*** (0.00)	0.58*** (0.00)
Property			-0.01 (0.54)	-0.01 (0.49)	-0.01 (0.62)			
Corruption						0.00 (0.89)	0.01 (0.72)	0.00 (0.94)
<i>N</i>	715	715	715	715	715	715	715	715
<i>R</i> ²	0.14	0.82	0.82	0.82	0.82	0.82	0.82	0.82

Standardized beta coefficients; *p*-values in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6 presents the estimation results when estimating using the policy indicator *Innovation* and the policy indicator *Pro-business2* instead of the indicator *Pro-business*. We produce estimations for the full models using either *Property* or *Corruption* as a proxy for institutional development and using either *Growth* or *Income* as the dependent variable. For all models (1-8) we find no effect of pro-market policy on economic development. This result is consistent with the previous estimations reported in models 3 and 6 of Tables 4 and 5. Moreover, the coefficient of *Pro-market* is close to zero and is neither systematically positive nor negative. The coefficient of *Innovation* is positive and significant for *all* models (1-4). The estimated effect of a one standard deviation increase in pro-business policy corresponds to a 0.33 standard deviation increase in growth (model 1). And, the estimated effect of a one standard deviation increase in pro-business policy corresponds to a 0.03 standard deviation increase in income.

We find a significant effect of pro-business type policies when using the indicator *Pro – business2* and estimating its effect on growth but not when using *Income* as the dependent variable. The coefficient of *Pro – business* in Table 4 model 3 is somewhat higher in magnitude than the coefficient of *Pro – business2* in Table 6 model 5. Also, regarding the results presented in Table 6, the magnitude of the coefficient of *Pro – business* in models 5 and 6 is roughly half the size of the coefficient of *Innovation* in models 1 and 2. Overall, we find no notable changes in the coefficients of the other macro covariates. One exception is the coefficient of *Education* which is no longer significant in model 1 of table 6. Overall, the results support the thesis that the positive growth effect of industrial policy are to large extent a result of policies that support advancements in technology and innovation.

Table 6: FE regression results: pro-market policy versus innovation/pro-business2 policy

	DEPENDENT VARIABLE: GROWTH AND INCOME							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Growth	Growth	Income	Income	Growth	Growth	Income	Income
Pro-Market	0.04 (0.79)	-0.06 (0.65)	0.01 (0.24)	0.01 (0.27)	0.05 (0.72)	-0.02 (0.92)	0.02 (0.10)	0.02 (0.11)
Innovation	0.33*** (0.00)	0.44*** (0.00)	0.03** (0.04)	0.03** (0.02)				
Pro-business2					0.19+ (0.10)	0.19+ (0.09)	0.01 (0.52)	0.01 (0.54)
Investment	0.74*** (0.00)	0.71*** (0.00)	0.06*** (0.00)	0.06*** (0.00)	0.76*** (0.00)	0.74*** (0.00)	0.07*** (0.00)	0.07*** (0.00)
Openness	1.45*** (0.00)	1.32*** (0.00)	0.17*** (0.00)	0.17*** (0.00)	1.57*** (0.00)	1.47*** (0.00)	0.18*** (0.00)	0.18*** (0.00)
Gconsumption	-0.91** (0.01)	-0.88* (0.01)	-0.10* (0.02)	-0.10* (0.02)	-0.89* (0.02)	-0.88* (0.03)	-0.10* (0.02)	-0.11* (0.02)
Education	1.36 (0.21)	1.91** (0.04)	0.55*** (0.00)	0.55*** (0.00)	1.74+ (0.07)	2.50* (0.02)	0.59*** (0.00)	0.60*** (0.00)
Income	-5.29*** (0.00)	-5.53*** (0.00)			-5.13*** (0.00)	-5.37*** (0.00)		
Property	-0.62*** (0.00)		-0.01 (0.76)		-0.70*** (0.00)		-0.01 (0.49)	
Corruption		-0.23+ (0.10)		-0.00 (0.96)		-0.16 (0.30)		0.01 (0.76)
<i>N</i>	715	715	715	715	715	715	715	715
<i>R</i> ²	0.44	0.40	0.83	0.83	0.43	0.38	0.82	0.82

Standardized beta coefficients; *p*-values in parentheses

+ *p* < 0.10, * *p* < 0.05, ** *p* < 0.01, *** *p* < 0.001

Finally, we test whether the effect of industrial policy on GDP growth is more pronounced when lagging the policy indicators with one year. We report all estimations results using the full models containing either *Property* or *Corruption* and the indicators for pro-business type policy: i.e. *Pro–business*, *Innovation*, and *Pro–business2*. These results are reported in Table 7. We find no effect of *Pro – market*_{*t*-1} on growth and no effect of *Pro–business*_{*t*-1} and *Pro–business2*_{*t*-1} on growth. We still find a positive and significant effect of *Innovation*_{*t*-1} on growth, but in comparison with the result reported in models 1-2 of Table 6, the coefficient is smaller in magnitude. As such, even though the effect of industrial policy on growth may be more pronounced one or more years after

a policy reform, when using perception-based policy data we find no strong evidence for a delayed time effect.

Table 7: FE regression results. Robustness check for delayed effects

	DEPENDENT VARIABLE: GROWTH					
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Pro – Market</i> _{<i>t</i>-1}	-0.03 (0.84)	-0.09 (0.53)	-0.03 (0.83)	-0.10 (0.45)	-0.00 (0.98)	-0.05 (0.69)
<i>Pro – business</i> _{<i>t</i>-1}	0.17 (0.21)	0.19 (0.17)				
<i>Innovation</i> _{<i>t</i>-1}			0.25+ (0.07)	0.33* (0.02)		
<i>Pro – business</i> _{2<i>t</i>-1}					0.11 (0.24)	0.10 (0.30)
Investment	0.81*** (0.00)	0.79*** (0.00)	0.80*** (0.00)	0.79*** (0.00)	0.82*** (0.00)	0.80*** (0.00)
Openness	1.69*** (0.00)	1.60*** (0.00)	1.63*** (0.00)	1.53*** (0.00)	1.71*** (0.00)	1.62*** (0.00)
Gconsumption	-0.95* (0.02)	-0.97* (0.02)	-0.97** (0.01)	-0.98** (0.01)	-0.96* (0.02)	-0.98* (0.02)
Education	1.70+ (0.10)	2.52* (0.03)	1.53 (0.13)	2.25* (0.05)	1.75+ (0.09)	2.55* (0.03)
Income	-5.58*** (0.00)	-5.85*** (0.00)	-5.73*** (0.00)	-6.05*** (0.00)	-5.50*** (0.00)	-5.75*** (0.00)
Property	-0.69*** (0.00)		-0.65** (0.01)		-0.69*** (0.00)	
Corruption		-0.27 (0.14)		-0.24 (0.20)		-0.20 (0.32)
<i>N</i>	658	658	658	658	658	658
<i>R</i> ²	0.43	0.39	0.43	0.40	0.43	0.38

Standardized beta coefficients; *p*-values in parentheses

+ *p* < 0.10, * *p* < 0.05, ** *p* < 0.01, *** *p* < 0.001

6 Conclusion

The key contribution of this study has been that of systematically unbundling the effect of different industrial policies on growth. We have presented empirical evidence that compares and contrasts the success of a wide notion of industrial policy: market oriented policy and industry support. To some extent the pro-market and pro-business distinction made by [Rodrik and Subramanian \(2005\)](#) is empirically traceable. We construct a measure for pro-market policy that captures a country's degree of implementation of free-market type policy and we construct a measure for pro-business type policy that summarizes a country's degree of implementation of policy that supports the development of (incumbent) industry. Overall, there is no strict opposition between pro-market and pro-business policy. Rather, countries' industrial policy path consists of a gradual implementation of more pro-business and pro-market policies. Further research investigating the compatibility between infant-industry support and pro-market policy is necessary to enrich this understanding; such analysis would benefit from industry-level data.

We find that pro-business type policy, in particular investment in technology and innovation, is an essential part of countries' overall industrial policy package and investing in such policy has a positive effect on economic development. We expect that extending the work of [Furman et al. \(2002\)](#)—on the determinants of innovation capacity—by separating innovation policy and innovation capabilities or the ‘innovation system’ ([Soete, 2007](#)) will increase understanding of the degree to which policy encourages innovative behaviour and acts as a growth driver. Moreover, this research has not controlled for the relation between competition and innovation. Yet, according to [Aghion et al. \(2005\)](#) competition creates both incentives and disincentives for innovation. [Peneder \(2012, pp.1\)](#) refers to this as the “misguided antagonism between” the positive ‘Arrow effect’ theory that is valid under low levels of initial competition versus a negative ‘Schumpeter effect’ theory that is valid under conditions of high-level of initial competition and low initial profits. We hope that further research will reveal the extent to which the optimal pro-market and pro-innovation policy mix is dependent on the level of competition. Finally, this study would benefit from further analysis comparing the perception-based policy data with qualitative data describing policy outcomes.

7 Appendix A

Table 8: Country List

CODE COUNTRY

ARG Argentina	JPN Japan
AUS Australia	KAZ Kazakhstan
AUT Austria	KOR Korea, South
BEL Belgium	LTU Lithuania
BGR Bulgaria	LUX Luxembourg
BRA Brazil	MEX Mexico
CAN Canada	MYS Malaysia
CHE Switzerland	NLD Netherlands
CHL Chile	NOR Norway
CHN China	NZL New Zealand
COL Colombia	PER Peru
CZE Czech Republic	PHL Philippines
DEU Germany	POL Poland
DNK Denmark	PRT Portugal
ESP Spain	QAT Qatar
EST Estonia	ROM Romania
FIN Finland	RUS Russia
FRA France	SGP Singapore
GBR United Kingdom	SVK Slovakia
GRC Greece	SVN Slovenia
HKG Hong Kong	SWE Sweden
HRV Croatia	THA Thailand
HUN Hungary	TUR Turkey
IDN Indonesia	TWN Taiwan
IND India	UAE United Arab Emirates
IRL Ireland	UKR Ukraine
ISL Iceland	USA United States
ISR Israel	VEN Venezuela
ITA Italy	ZAF South Africa
JOR Jordan	

Table 9: Sources

Variable	Definition	Source	Scale
Pro-market, pro-business, Innovation, Pro-business2	Policy indicators	IMD (2011)	Indicators are normalized on a scale of 0 to 1.
Pro-market and pro-business	Policy indicators	IPD (2009)	Indicators are normalized on a scale of 0 to 1.

Continued on next page

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Income	Real GDP per capita (Constant Prices: Chain series)	Heston et al. (2011)	
Growth	Growth rate of Real GDP per capita (Constant Prices: Chain series)	Heston et al. (2011)	Logarithmic change
Openness	Openness at 2005 constant prices	Heston et al. (2011)	% of GDP
Investment	Investment Share of PPP Converted GDP Per Capita at 2005 constant prices (Laspeyres series)	Heston et al. (2011)	% of GDP
Gconsumption	Government Consumption Share of PPP Converted GDP Per Capita at 2005 constant prices (Laspeyres series)	Heston et al. (2011)	% of GDP
Education	Average of mean years of education men and mean age of education woman; 25 and older	Institute for Health Metrics and Evaluation (IHME) (2013)	Average years of education
Property	Property Rights	Heritage Foundation (2013)	From low property rights protection = 0 to high property rights protection = 1
Corruption	Freedom from corruption	Heritage Foundation (2013)	From lack of freedom from corruption = 0 to high freedom from corruption = 1

8 Appendix B

8.1 Validity of Policy Indicators

In this section, the two policy domains constructed on the basis of the WCY data are compared with alternative policy indicators. We select variables from the Institutional Profiles Database (IPD) 2009 that are conceptually close to the variable selection of the WCY dataset. The policy indicators from the IPD are listed in Table 11. Based on the policy domains constructed for the WCY dataset, the IPD variable selection is sorted in order to describe either pro-business or pro-market policy.

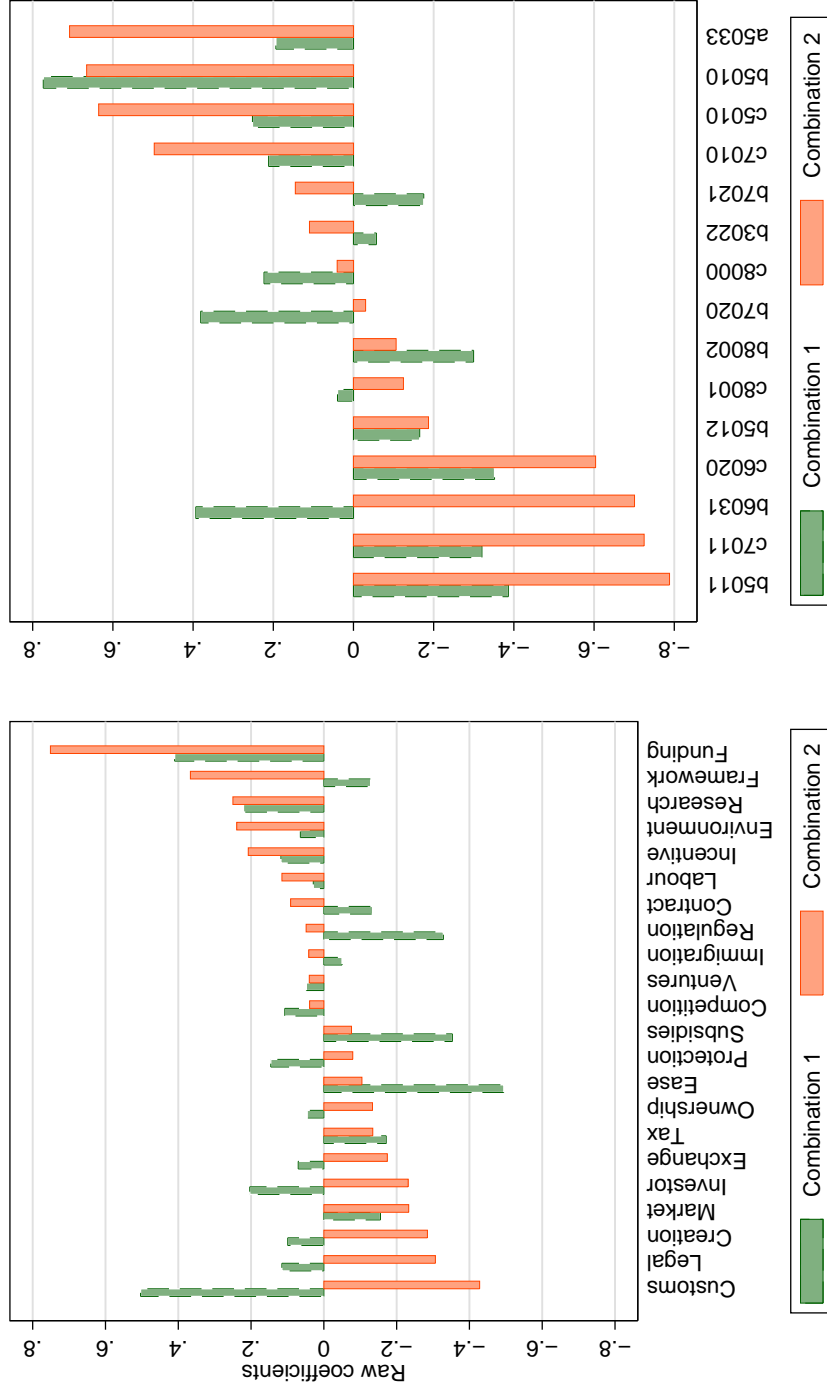
We use Canonical Correlation Analysis (CCA) to compare the variable selection from the WCY with the variable selection from IPD. We assume that countries' score on pro-market and pro-business policy is relatively constant over time and therefore use the IPD

data from 2009 and WCY data from the years 2007-2011. The CCA is based on 272 sample observations and 56 countries. Unlike the sample used for the PCA in section 4, the countries Croatia, Iceland, and Luxembourg are excluded in the CCA due to missing observations in the IPD 2009 dataset. The results of the CCA are presented in Figures 6 and 7. We focus on the first and second linear combinations. The Pearson canonical correlations of the first and second linear combination are 0.9 and 0.85.¹⁷

The raw coefficients of the first two linear combination of the CCA are presented in Figure 6. The raw coefficients are interpreted as the effect of a one unit increase in a variable on the corresponding canonical variate. We cannot identify a pattern across the pro-market and/or pro-business policy variables based on the first linear combination and the raw coefficients. The second linear combination does identify some pro-business variables from the WCY dataset that are positively associated with pro-business variables from the IPD dataset. The pro-business variable that describes the availability of funding for technological development (Funding) has a very high positive loading compared to the other variables in the WCY data. Also, in descending order, Framework, Research, and Environment have a positive loading and have previously been identified as pro-business variables. The three variables that have the highest positive loading amongst the IPD variables are classified under pro-business policy. These three variables describe government support for research and development (A5033), institutions that support research and technological acquisitions for SMEs (B5010), and government venture capital initiatives (C5010). The variables that have high negative loadings include both pro-business and pro-market variables.

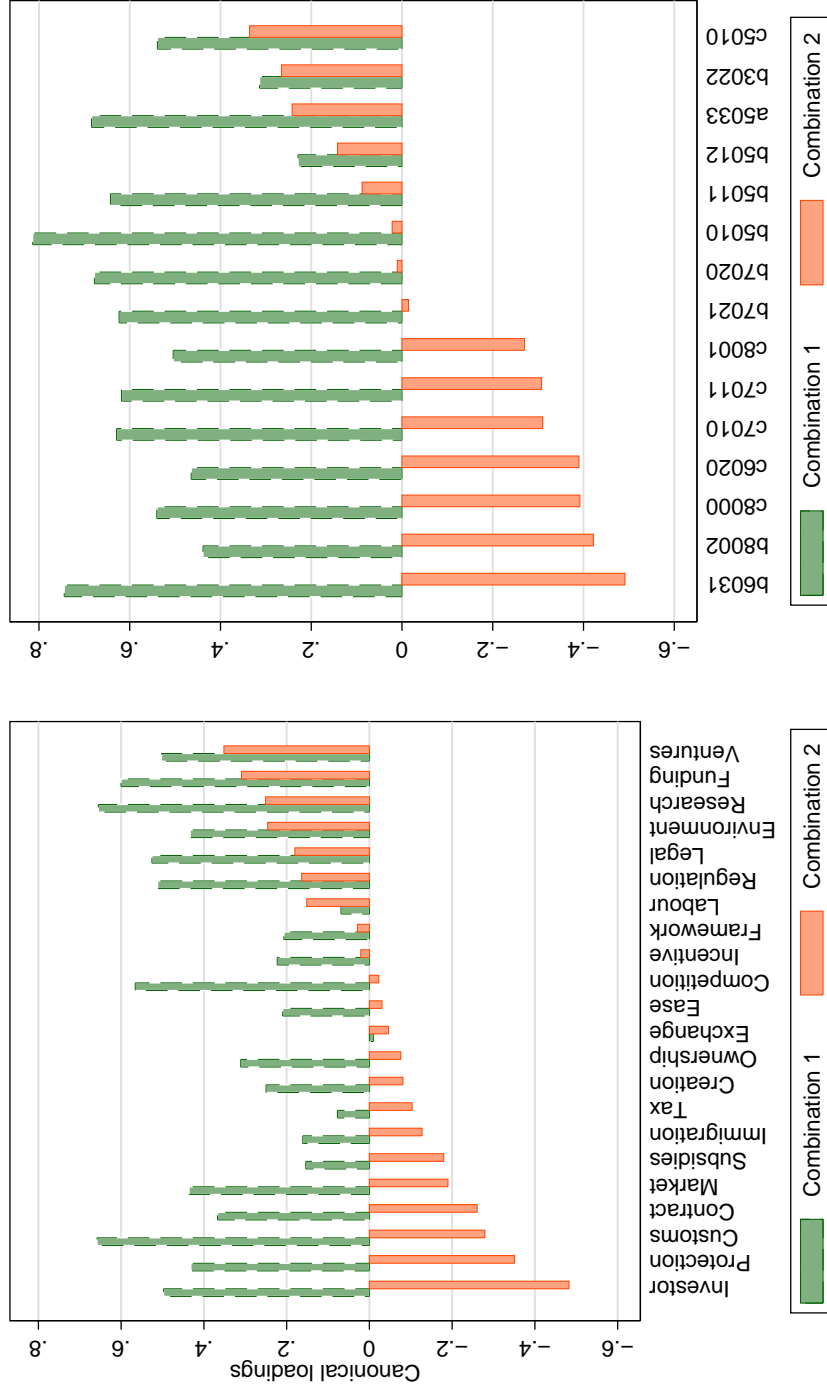
¹⁷ The Wilks lambda, Pillai's trace, Lawley-Hotelling trace, and Roy's largest root tests are all significant at a 1% level.

Figure 6: Raw Coefficients
 Results of Canonical Correlation Analysis (56 countries)
 First and Second Linear Combinations



WCY 2007-2011 and IPD 2009

Figure 7: Canonical Loadings
 Results of Canonical Correlation Analysis (56 countries)
 First and Second Linear Combinations



WCY 2007-2011 and IPD 2009

The loadings resulting from the CCA are presented in Figure 7. Following Rencher (1992), the canonical loadings represent the correlation of the variables with their corresponding linear combination (canonical variate). The canonical loadings include less information than the raw coefficients do. However, the canonical loadings are useful to assist in the interpretation of results. The loadings of the first linear combination are high for most of the variables in both datasets. Some of the WCY variables have a relatively low loading (e.g Tax). These variables also have conceptually less relation with the IPD variables. The second linear combination distinguishes two groups of variables in both datasets. Most of the variables that have negative loadings have previously been identified as pro-market variables. And, most of the variables that have positive loadings are associated with pro-business policy.

Based on the raw coefficients, the canonical loadings, and the canonical correlations we find that (1) the WCY and IPD policy variables have similar variation (2), and for both datasets, the pro-market and pro-business policy variables can be distinguished.

Finally, we compute averages for the selection of pro-market variables and for the selection of pro-business policy variables from the IPD dataset. Table 10 presents the Pearson correlations for the WCY and IPD pro-market and pro-business indicators. The indicators are all positively correlated. The correlation amongst the WCY data is the highest. The correlation between the policy indicators constructed from the IPD data is 0.53. The pro-business indicator from WCY has a higher correlation with the IPD pro-business indicator than with the IPD pro-market indicator. Also, the WCY pro-market indicator has a higher correlation with the IPD pro-market indicator than with the IPD pro-business indicator.

Table 10: Correlations between Policy Indicators (WCY 2007-2011 & IPD 2009)

		WCY		IPD	
		Pro-market	Pro-business	Pro-market	Pro-business
WCY	Pro-market	1			
	Pro-business	0.82	1		
IPD	Pro-market	0.56	0.31	1	
	Pro-business	0.44	0.41	0.53	1

Table 11: IPD 2009

Pro-business Development Policy

A5033: Government support for private or public research & development (1-4)

B3022: Existence of targeted support measures for emerging growth sectors (0-4)

B5010: Existence of institutions or arrangements to support research and technological acquisitions for SMEs (0-4)

B5011: Existence of institutions or arrangements to support research and technological acquisitions for large firms (0-4)

B5012: Existence of institutions or arrangements to encourage technology transfers and skills transfers from foreign players to domestic players (0-4)

C5010: Government venture capital incentives (0-4)

Pro-market Development Policy

B6031: Effectiveness of enforcement of international TRIPS arrangements for the protection of intellectual property (0-4)

B7020: Effectiveness of competition regulation arrangements (non-banking) to combat restrictive collective agreements i.e. cartels (0-4)

B7021: Effectiveness of competition regulation arrangements (non-banking) to combat abuses of dominant positions (0-4)

B8002: Restrictions on the issue of import licenses (1-4)

C6020: Publication requirement for firms issuing shares (0-4)

C7010: Existence of competition arrangements in the banking system to combat restrictive collective agreements i.e. cartels (0-4)

C7011: Existence of competition arrangements in the banking system to combat abuse of dominant position (0-4)

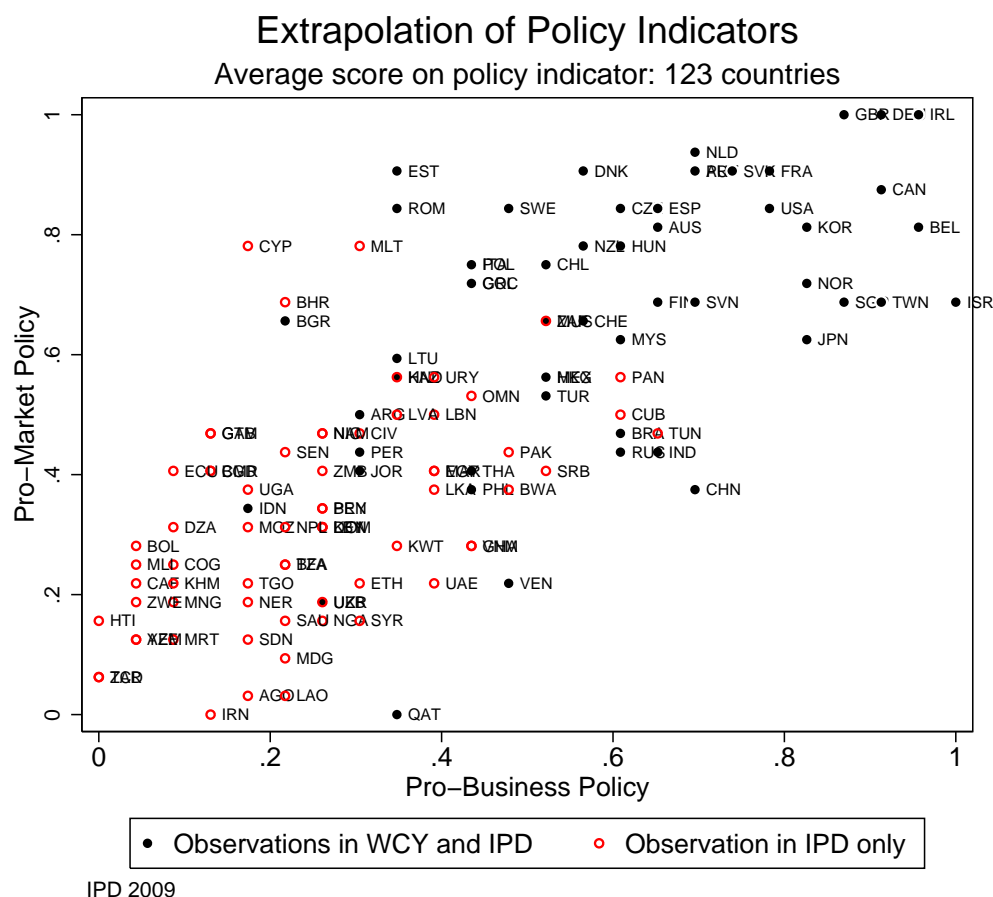
C8000: Openness of bank capital to foreign shareholding (0-4)

C8001: Right of establishment for foreign deposit banks and investment banks (0-4)

8.2 Extrapolation of Policy Indicators

We are interested in mapping countries' industrial development path ranging from countries with low income and a fragile institutional setting to countries with high income and a strong institutional setting. We construct average pro-market and pro-business indicators for the 123 countries in the IPD 2009 data using the selection of policy indicators from IPD as discussed above in section 8.1. The IPD data contains more less developed countries than the WCY dataset.

Figure 8: Analysis of Policy Indicators using IPD data



The scores of the 123 countries on the pro-market and pro-business indicators are illustrated in Figure 8. As indicated by the legend in the figure, the countries that we document using the WCY dataset are given a different label than the countries for which WCY has no data. Overall, the former group of countries score higher on the policy indicators than the latter group does. Based on this figure it seems that there is a linear relationship between the two policy indicators constructed using the IPD data. This result also confirms that countries that have a relatively low income level and weak institutional setting have implemented less industrial policy.

References

- Acemoglu, D., Aghion, P., and Zilibotti, F. (2006). Distance to Frontier, Selection, and Economic Growth. *Journal of the European Economic Association*, 4(1):37–74.
- Acemoglu, D., Akcigit, U., Bloom, N., and Kerr, W. R. (2013). Innovation, reallocation and growth. NBER working paper series 18993.
- Aghion, P., Bloom, N., Blundell, R., Griffith, R., and Howitt, P. (2005). Competition and Innovation: an Inverted-U Relationship. *The Quarterly Journal of Economics*, 120(2):701–728.

- Aghion, P., Dewatripint, M., Du, L., Harrison, A., and Legros, P. (2012). Industrial policy and competition. NBER working paper No. 18048.
- Aiginger, K. (2007). Industrial policy: A dying breed or a re-emerging phoenix. *Journal of Industry, Competition and Trade*, 7(3):297–323.
- Aiginger, K. and Sieber, S. (2006). The Matric Approach to Industrial Policy. *International Review of Applied Economics*, 20(5):573–601.
- Amsden, A. H. (2008). *The Washington Consensus Reconsidered: Towards a New Global Governance*, chapter The Wild Ones: Industrial Policies in the Developing World, pages 41–60. Oxford University Press.
- Bianchi, P. and Labory, S. (2006). Empirical evidence on industrial policy using state aid data. *International Review of Applied Economics*, 20(5):603–621.
- Breschi, S. and Cusmano, L. (2004). Unveiling the texture of a european research area: emergence of oligarchic networks under eu framework programmes. *Int. J. Technology Management*, 27(8):747–772.
- Buigues, P.-A. and Sekkat, K. (2011). Public subsidies to business: An international comparison. *Journal of Industry, Competition and Trade*, 11(1):1–24.
- Buts, C. and Jegers, M. (2013). The effect of state aid on market shares: An empirical investigation in an eu member state. *Journal of Industry, Competition and Trade*, 13(1):89–100.
- Cameron, A. C., Gelbach, J. B., and Miller, D. L. (2011). Robust inference with multiway clustering. *Journal of Business & Economic Statistics*, 29(2):238–249.
- Cimoli, M., Dosi, G., and Stiglitz, J. E. (2009a). *Industrial Policy and Development*, chapter The Political Economy of Capabilities Accumulation: The Past and Future of Policies for Industrial Development. Oxford University Press.
- Cimoli, M., Dosi, G., and Stiglitz, J. E. (2009b). *Industrial Policy and Development*, chapter The Future of Industrial Policies in the New Millenium: Toward a Knowledge-Contered Development Agenda. Oxford University Press.
- Cohen, E. (2007). Industrial Policies in France: The Old and the New. *Journal of Industry, Competition and Trade*, 7(3):213–227.
- Criscualo, C., Martin, R., Overman, H. G., and van Reenen, J. (2012). The causal effects of an industrial policy. Center for Economic Policy.
- De la Torre, A., Gozzi, J. C., and Schmukler, S. L. (2007). Innovative Experiences in Access to Finance: Market Friendly Roles for the Invisible Hand? World Bank Policy Research Policy Paper 4326.
- Di Maio, M. (2009). *Industrial Policy and Development*, chapter Industrial Policies in Developing Countries: History and Perspectives. Oxford University Press.
- Fagerberg, J. and Srholec, M. (2008). National innovation systems, capabilities and economic development. *Research Policy*, 37(9):1417–1435.

- Furman, J. L., Porter, M. E., and Stern, S. (2002). The determinants of national innovative capacity. *Research Policy*, 31(6):899–933.
- Gerschenkron, A. (1962). *Economic Backwardness in Historical Perspectives*. Harvard University Press.
- Greenwald, B. and Stiglitz, J. E. (2006). Helping infant economies growth: Foundations of trade policies for developing countries. *The American Economic Review*, 96(2):141–146.
- Ha-joon Chang (2002). *Kicking Away the Ladder: Development Strategy in Historical Perspective*. Anthem Press.
- Heritage Foundation (2013). Index of economic freedom.
- Heston, A., Summers, R., and Aten, B. (2011). Penn World Table Version 7.0 .
- Hiley, M. (2000). *Lessons for sub-Saharan Africa from the experience of Easia Asia: SADC and ASEAN compared*. Edward Elgar.
- IMD (2011). World Competitiveness Yearbook (WCY).
- Institute for Health Metrics and Evaluation (IHME) (2013). Educational Attainment and Child Mortality Estimates by Country 1970-2009.
- IPD (2009). Institutional Profiles Database.
- Khan, M. H. (2008). Vulnerabilities in Market-led Growth Strategies and Challenges for Governance. Project Report DFID.
- Khan, M. H. and Blankenburg, S. (2009). *Industrial Policy and Development*, chapter The Political Economy of Industrial Policy in Asia and Latin America. Oxford University Press.
- Lee, J. (2011). The performance of industrial policy: Evidence from korea. *International Economic Journal*, 25(1):1–27.
- Livesey, F. (2012). Rationales for industrial policy based on industry maturity. *Journal of Industry, Competition and Trade*, 12(3):349–363.
- Melo, A. (2001). Industrial policy in latin america and the caribbean at the turn of the century. Research Department Publications 4281, Inter-American Development Bank, Research Department.
- North, D. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press, New York.
- North, D. C., Wallis, J. J., and Weingast, B. R. (2009). *Violence and Social Orders: a conceptual framework for interpreting human history*. Cambridge University Press.
- Pack, H. and Saggi, K. (2006). The case for industrial policy : a critical survey. Policy Research Working Paper Series 3839, The World Bank.
- Peneder, M. (2012). Competition and Innovation: Revisiting the Inverted-U Relationship. *Journal of Industry, Competition and Trade*, 12(1):1–5.

- Peres, W. (2009). *Industrial Policy and Development*, chapter The (Slow) Return of Industrial Policies. Oxford University Press.
- Possas, M. L. and Borges, H. (2009). *Industrial Policy and Development*, chapter Competition Policy and Industrial Development. Oxford University Press.
- Rencher, A. C. (1992). Interpretation of canonical discriminant functions, canonical variates, and principal components. *The American Statistician*, 46(3):pp. 217–225.
- Rodrik, D. (2008). *One Economics, Many Recipes: globalization, institutions and economic growth*. Princeton University Press.
- 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*, 9:131–165.
- Rodrik, D. and Subramanian, S. (2005). From "Hindu Growth" to Productivity Surge: the mystery of the Indian growth transition. IMF Staff Papers, 52(2).
- Schamis, H. E. (2002). *Re-forming the state: the politics of privatization in Latin America and Europe*. University of Michigan Press.
- Soete, L. (2007). From industrial to innovation policy. *Journal of Industry, Competition and Trade*, 7(3):273–284.
- Tribe, M. (2000). *Industrial Development and Policy in Africa*. Edward Elgar.
- Valila, T. (2006). No policy is an island - on the interaction between industrial and other policies. EIB Papers 7/2006, European Investment Bank, Economics Department.
- Wade, R. H. (2009). Rethinking industrial policy for low income countries. *African Development Review*, 21(2):352–366.
- Wade, R. H. (2012). Return of industrial policy? *International Review of Applied Economics*, 26(2):223–239.
- Zhu, T. (2007). *Institutional Change and Economic Development*, chapter Rethinking import-substituting industrialization: Development strategies and institutions in Taiwan and China, pages 261–279. UNU Press.
- Zourek, H. (2007). The european commissions new industrial policy in an integrating and globalizing world. *Journal of Industry, Competition and Trade*, 7(3):285–295.

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