Income Convergence in Iranian Regions

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Abstract

The neoclassical growth model predicts convergence of productivity or per capita output levels across regions. We investigate this hypothesis for the Iranian economy using data on demand deposits as a proxy for GDP. Moreover, the analysis investigates the effects of rent-seeking on the convergence process. In contrast to previous papers, the analysis shows robust evidence in favour of both sigma and beta convergence across the Iranian provinces and provide some indications on the adverse effect of rent-seeking on regional convergence.

Keyword: Regional convergence, economic growth, rent-seeking

1- Introduction

A hypothesis implicitly embedded in the neoclassical model of economic growth is productivity convergence across regions. If the labour force participation is constant, convergence of per capita income is implied. Therefore, there should be an inherent tendency for poorer regions to catch up to richer ones. Due to its relevance for regional economic policy, convergence has been an active area of research for many years, see Barro and Sala-i-Martin (1991, 1992) and Mankiw, Romer, and Weil (1992) as seminal contributions.

On the other hand, the effects of rent-seeking and corruption on economic growth have been under study since the early 1990s. Rent-seeking is likely harmful for the economic performance and can hinder convergence if these activities are concentrated in particular regions of a country. The main reason for an adverse effect is the allocation of most talented people to rent-seeking activities rather than innovation and entrepreneurship. In this study economic convergence is examined by using the data of 25 Iranian provinces. In contrast to previous studies, sigma and beta convergence are established. Moreover, some evidence on the adverse effect of rent-seeking on the process of regional convergence is provided.

The paper is organized in six sections. The next two sections review the literature on convergence (section 2) and on the relation between economic growth and rent-seeking (section 3). Section 4 discusses the macroeconomic performance in Iran over the last decades. Section 5 is devoted to data issues and holds the empirical results at a regional level. Finally, section 6 concludes.

2- Economic convergence across regions

Convergence of productivity and per capita income is an important prediction of the neoclassical growth model, see Barro and Sala-i-Martin (1991, 1992). Although it has been heavily criticized by the endogenous growth theory, β-convergence is still a workhorse of empirical research. Because of diminishing marginal returns of the reproducible inputs, regions should converge to a steady state, where the evolution is solely driven by technological progress. Given that steady state growth is the same across

regions, absolute β-convergence will hold. However, if regions differ in their steady state determinants like savings rate and population growth, they will converge to individual paths, implying that β-convergence might only hold in a conditional sense (Mankiw, Romer, Weil, 1992). The more homogeneous the regions are, the more appropriate the absolute concept. Although convergence has been examined initially by cross sections of countries, the interest has shifted to regions within a country. On the one hand, the drivers of the convergence process, like capital mobility and labour migration are more pronounced for these areas, and culture or institutions are more similar within the country borders. However, due to a higher degree of specialization, regions tend also to be more heterogeneous than countries, implying that convergence might not hold.

Nevertheless, Barro and Sala-i-Martin (1991, 1992, and 2003) and Sala-i-Martin (1996) have detected β-convergence for US states, European regions and Japanese prefectures. The estimated speeds of convergence are extremely slow, but surprisingly similar across different data sets: regions tend to converge at a speed of approximately 2 percent per year. This speed is similar to the one found for country data. According to Coulombe and Lee (1995) changes in the terms of trade, government transfers, and taxes have supported convergence between Canadian provinces. Cashin (1995) has examined convergence for Australian states and concluded that convergence occurred especially in earlier periods. Note that convergence might not be interpreted as evidence for the theoretical concept, as the findings might be also linked to structural forces, like the shift from agriculture to manufacturing, see Paci and Pigliaru (1997) and Caselli and Coleman (2001).

Many studies are also available for EU countries. Among others, Kosfeld, Eckey, and Dreger (2006) found absolute and conditional β-convergence for German regions and reported adjustment speeds in the range of 5 to 7 percent. Also, Persson (1997) detected a high speed of convergence for Swedish counties. However the evidence is not unique and depends on the time period considered in the analysis. McGuiness and Sheehan (1998) and Gripaios, Bishop and Keast (2000) reported an increase in regional dispersion in the UK. Similar results have been obtained for Italian and Greek regions, see Terassi (1999), Siriopoulos and Asteriou

(1998), Petrakos and Saratsis (2000). Gezici and Hewings (2004) are unable to find convergence for Turkish provinces, but reported a high degree of spatial dependencies.

While convergence across the EU is often confirmed for earlier periods, the process came to a halt in the 1980s, see also Lopez-Bazo, Vaya, Mora and Surinach (1999) and Cuadrado-Roura (2001). But, Karras (2001), Maurseth(2001) and Dall'erba (2005) found results in line with β-convergence in later periods. After a temporary halt in the 1980s, a re-emergence in convergence might have occurred. But there is little support for the claim that the introduction of the European Monetary Union is an important driver in this regard (Martin, 2001).

Empirical evidence is available not only for developed countries, but also for developing countries and NICs. Serra, Pazmino, Lindow, Ramirez and Sutton (2006) looked at some Latin American states and revealed evidence in favour of convergence within Argentina, Brazil, Chile, Colombia, Mexico and Peru. The speed of convergence is often very low, but it doubles after controlling for different regional steady states. National disparities in per capita output increased temporarily after each country pursued measures of trade liberalization.

Jian, Sachs and Warner (1996) and Fujita and Hu (2001) have detected convergence across Chinese coastal provinces, but more divergence between the coast and the interior, probably due to the increase in globalization and the liberalization of markets, see also Lin and Song (2002). In India, a small group of states is pulling away, thereby causing a second peak in the income distribution (Trivedi, 2003). Hossain (2000) found β-convergence of per capita GDP for most regions in Bangladesh. Kim (2005) has analyzed Korean regions and reported a very high speed of convergence of about 8 percent per year.

3- The adverse impact of rent-seeking on economic growth

The wide dispersion of per capita income across countries might be related to differences in social infrastructures; see Hall and Jones (1999). Social infrastructure refers to the overall environment of economic activities, including government policies; see North (1990) and Baumol (1990). In case

of the developing countries, Sachs and Warner (1995), Mauro (1995), Knack and Keefer (1995), Acemoglu, Johnson, and Robinson (2001, 2002), and Engerman and Sokoloff (2002) have explored the role of geography in the adoption of appropriate institutions from the Western world which foster economic growth and development. A favourable social infrastructure supports productive activities and encourages physical and human capital accumulation, invention, and technology transfer. In this way, private and social returns are kept closer together, thereby providing incentives for productive activities. Properly defined institutions cause agents to be rewarded by the full amount of their production. Individuals do not need to invest resources in avoiding diversion.

Rent-seeking and corruption can hamper the economic performance. This kind of behaviour covers all activities in which an individual obtains an amount not from productive activities, but from predation, bribery, suing someone in the court, using public facilities for private purposes and so on. The economic analysis of the consequences of rent-seeking started with the pioneering work of Tullock (1967, 1971) and Krueger (1974). Baumol (1990, 2004) has emphasized the allocation of entrepreneurship, which can be a crucial factor in explaining the different growth experience across countries. Although levels of entrepreneurship might be similar, the economic performance can be very different as a result of different allocations of talents. The allocation of entrepreneurship to productive and rent-seeking activities depends on the reward structure in the economy.

Murphy, Shleifer, and Vishny (1991, 1993) examined the allocation of talent and how people decide to be workers, producers, or rent-seekers. The most talented people are attracted either to productive or rent-seeking activities, depending on the market size, compensation, and the returns to scale. If the most talented people decide to be rent-seekers as a result of the reward structure, the growth rate will be lower. In the model of Acemoglu (1995) the reward structure is determined endogenously. Rent-seeking exhibits increasing returns to scale. This raises the existence of multiple equilibria and underdevelopment traps.

Grossman and Kim (1995), Grossman (1998) and Mehlum, Moene and Torvik (2003) have shown how economies may get stuck in clubs of predators with vicious cycles of poverty and predation. Interest groups can

deter the introduction of new technologies or the adoption of existing technologies, see also Acemoglu and Robinson (2000). Individuals or political groups who benefit under the existing political system can be a barrier for higher growth. Countries can also suffer from a weak institutional framework (Bjorvatn and Selvik, 2005). Competing bureaucrats impose independent and high levels of bribes on private businesses. In addition, the necessity of secrecy can shift public investment from high value to useless alternatives if the latter provide better opportunities to veil corruption. Darby, Li and Muscatelli (2004) have analyzed the effect of uncertainty on the outcome of political elections and the composition of public expenditures. Inefficiencies can arise as government expenditures are switched from investment to consumption.

From an empirical point of view, the lack of data on rent-seeking is a serious obstacle. Magee, Brock and Young (1989) found lower growth rates in countries with more lawyers. Barro (1991) has suggested high levels of government consumption and political coups as indications for rent-seeking. Murphy, Shleifer and Vishny (1991) have proposed the ratio of college enrolments in law and in engineering to total enrolments. The idea is that a higher ratio of college enrolments in engineering is a measure of allocation of talent to innovative and productive activities, while a higher ratio of college enrolments in law is an implication of allocation of talent to rent-seeking. They reported positive and significant effects of engineering enrolments, while the effects of law enrolments are insignificant. Brumm (1999) looked at employment in public and legal services, while Cole and Chawdhry (2002) used the numbers of interest organizations registered to lobby in the legislature process.

Mauro (1998) reported a negative relationship between corruption and government expenditure on education, which is critical for growth, but normally not an attractive area for rent-seeking, see also Guetat (2006). According to Baland and Francois (2000) a resource boom increases rent-seeking and lowers GDP growth especially if the share of entrepreneurs in the economy is low.

Under some circumstances rent-seeking might also contribute to higher growth because of patron-client networks. This is observed in some East Asian countries, see Kang (2002), Haggard (2004) and Rock and Bonnett (2004). State patrons are strong relatively to clients and corruption networks

are organized and managed by a centralized government. Li and Zhou (2005) provide some evidence on the relationship between political turnover and economic performance in China. In fact, the promotion of provincial leaders with a better economic record explains much of the economic success of China.

A specific problem that has been discussed for countries with rich natural resources like Iran is the so called resource curse; that is, these countries often have experienced lower rates of economic growth (Auty, 1993). One explanation is massive rent-seeking and corruption, see Alizadeh (2003), Renani and Khezri (2005) and Bjorvatn and Selvik (2005).

4- Economic development in Iran and rent-seeking

Iran experienced high and sustained output growth with very low inflation in the 1960s, when oil incomes accounted only for a small share in Iran's GDP. After periods of rising oil prices in the 1970s, Iran experienced lower growth rates on average while it encountered double digit inflation rates (figure 1).

During the 1980s, growth rates lowered further and became even negative while inflation remained high, mainly due to the war between Iran and Iraq. At the same time, Iran's economy became more regulated and state-owned. In the early 1990s, a surge in government expenditures due to the rebuilding of war destructions and the liberalization of the economy caused very high inflation and moderate growth rates. From 1996-2005, Iran gained relative stability because of economic reforms and less expansionary policies. The country experienced gradually decreasing inflation rates and a sustained growth path accompanied by increasing oil revenues that were not massively injected in the economy. After 2005/06, this process came to a halt, mainly as a result of expansionary fiscal and monetary policies by the new government.

The influence of rent-seeking on the Iranian economy has increased since the oil price hikes of the 1970s. Before the 1970s, rent-seeking was quite centralized among a limited group of elites, mainly linked to Shah's relatives. Therefore, the situation was more or less similar to the situations of East Asian countries. The surge in oil incomes caused a massive increase in

government expenditures to pursue ambitious but inaccessible development plans. This surge in government expenditures caused the rent-seeking to become more attractive and widespread. In effect, it created an opportunity to seek rents that brought about endogenous rent-seeking networks with the main goal of maximizing their benefits without (necessarily) close political ties to Shah.While almost all large businesses came under the control of the government after the revolution, rent-seeking continued. The driving force was the nationalization of almost all big firms and businesses and the tendency for a more state-owned economy.
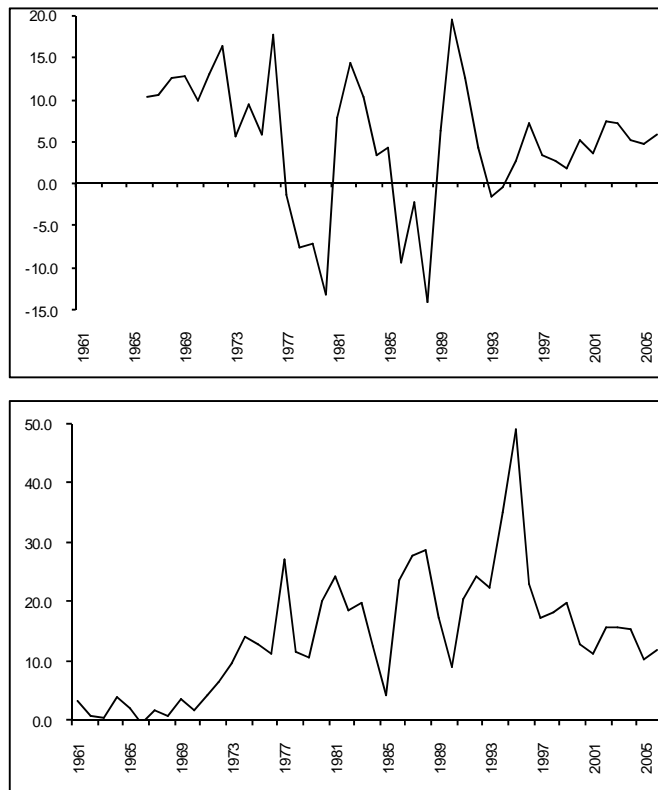

Figure 1: Real GDP growth (top) and CPI inflation in Iran

Source: International Monetary Fund, World Economic Outlook 2008/1, Data before 1980: World Market Monitor, Global Insight.

Most rent-seeking activities are organized by establishing some kinds of businesses and using connections with government and public sector to obtain rent; for example import licenses, subsidized loans, contracts to provide goods and services for the government or implementing development projects. It is expected that rent-seeking activities have a regional dimension, i.e. they are concentrated in Tehran. This is the main reason for the attractiveness of Tehran for the most talented and highly educated people. However, this does not mean that highly talented people do not contribute to productive activities in Tehran or other developed regions. In effect, even rent-seeking activities require some inputs that are provided by private sector that are pursuing profits. Therefore, more rent-seeking activities necessitate more inputs and higher demand for other private sector businesses. For example, the concentration of wealth in Tehran cause the demand for high quality health care to increase and these health care will be provided by private sector hospitals. So, the most talented and experienced physicians are attracted to Tehran not (necessarily) because they are rent-seekers but because there is a better situation and market for their services. It is why rent-seeking could promote economic activities in rich regions.

5- Regional convergence in Iranian regions

There have been some empirical studies on regional convergence and disparity in Iran, recently. Rahmani and Eckey (2004) examines regional convergence by using demand deposits as proxy for GDP in provinces over 1990-2000 and do not find strong evidence for convergence. Rahmani (2005) does not find evidence on convergence by testing β-convergence and using data on household income over 1997-2001. Some other studies that have been done contain the similar result. Noorbakhsh (2002) examines regional disparity in Iran by using Human Development Report of Iran and proposes a composite index of development and thetreby a policy model to lower regional disparities. Noorbakhsh (2005) examines regional disparity and polarisation in Iran. Although he finds weak evidence on β-convergence, his comprehensive empirical study shows that regional disparity, especially in the case of urban areas, has increased over 1991-2001. Our focus is not on the measures of regional disparity, but mainly to provide evidence on

regional β-convergence and indirect evidence on the effect of rent-seeking on this process of convergence. However, our results are not inconsistent with the results of comprehensive study on regional disparity and polarization in Iran by Noorbakhsh(2002,2005).

The dominance of Tehran and to a lower extent some other provinces like Esfahan affects not only the growth performance in the country as a whole, but might be also important for the convergence in the provinces. Therefore, it can also influence convergence of per capita income across the Iranian regions. In general, data availability at the regional level is very limited. For this reason, the subsequent analysis can provide evidence only for the time period 1996-2005 . According to figure 1, the time period under study has been a period of relative stability of the Iranian economy, where structural breaks were less important.

Data have been gathered from different issues of Statistical Yearbook of the Center of Iran Statistics as well as the reports of economic and social situations of the provinces that are published by the Central Bank of the Islamic Republic of Iran. The analysis is based on annual data covering the 1996-2005 period. Currently, Iran has 30 provinces, while there were 25 in 1996. Therefore, the previous borders are used to have a consistent dataset.

In the following, demand deposits of the private sector are used as a proxy for GDP, see also Rahmani and Eckey (2004) for a discussion of this indicator. Demand deposits are gathered from banks' balance sheets and have a quite high degree of precision. As public sector deposits are excluded, they are largely related to private economic activities and incomes. In fact, GDP includes oil income that is a public business without strong correlation to regional economic activities. The nominal demand deposit is deflated by the CPI (1997=100) of the respective provinces, and per capita demand deposits are obtained by dividing on the population of the provinces.
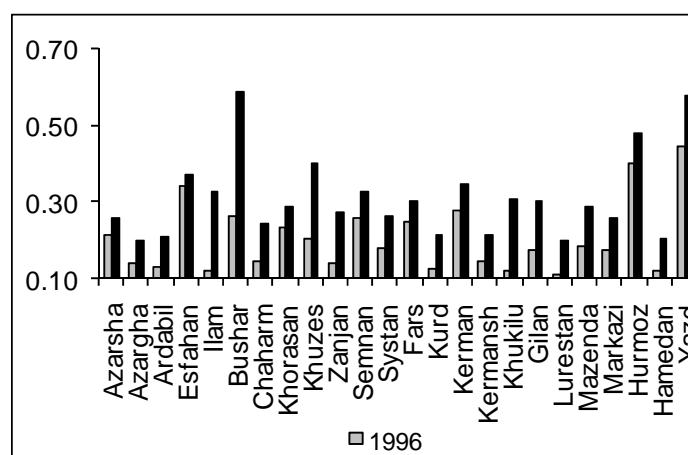
Figure 2: Demand deposits in Iranian regions per capita, 1996 and 2005
(Tehran=1)

Note: Nominal demand deposits deflated by regional CPI, divided by population.

Figure 2 displays the distribution of per capita real deposits in 1996 and 2005 relative to Tehran. All provinces indicate a decline in the gap to the benchmark, most pronounced in Bushar and Khukilu mainly as a result of increase in the projects related to oil and gas and therefore the formation of some private sector businesses that have contracts to implement those projects (Although these private sector businesses are originally based

in Tehran but they have accounts in the local branches of banks and it is the reason for

the rapid increase in demand deposits in those provinces). The indicator is still less than 25 percent of the capital in Azargha, Ardabil, Chaharm, Kurdistan, Kermansh, Lurestan and Hamedan. Besides demand deposits, initial real per capita levels of public consumption and investment are considered. In fact, rent-seeking activities tend to be more pronounced if government expenditures are high. The measures refer to real per capita terms, obtained by regional CPI and population figures.

In contrast to Ramani and Eckey (2004), the evidence points to ongoing economic convergence across Iranian regions. Sigma convergence is detected, as the coefficient of

variation of real per capita deposits has dropped markedly from 0.8 in 1996 to 0.5 in 2005. Absolute beta convergence can be also confirmed, see the models I and III in table 1. Here, the mean growth rate of per capita real demand deposits is regressed on the initial deposit level per capita.[1] Beta convergence occurs with a speed of approximately 3.7% per annum. Note that this value should be interpreted as an upper limit and there could be some reasons that it overestimates the convergence process. First, ongoing financial development and using more banks services in some poor regions in last two decades (compared with rich provinces that using banks services has been under way since 1960s and therefore the growth of this services has not been too high) might have raised the coefficient. Second, there have formed many private sector firms and contractors with strong connections to government in Tehran and some other rich provinces,

Table 1: Beta convergence in Iranian regions

Variable	Entire sample		Excluding Tehran	
	I	II	III	IV
Constant	0.03 (2.49)	0.166 (4.3)	0.028 (1.67)	0.187 (5.26)
Initial level	-0.037 (3.08)	-0.017(1.78)	-0.04(2.375)	-0.03 (2.69)
Gov consumption		0.038 (1.95)		0.049 (2.75)
Gov investment		0.021 (2.23)		0.029 (3.17)
R2 Adj	0.34	0.56	0.23	0.61
SBIC	-4.65	-4.88	-4.6	-5.11

1- In principle, dependencies across the regions should be taken into account. They may arise from shocks, that can generate spillovers to other areas (Anselin, 1988). However, the Moran's I coefficient does not indicate spatial autocorrelation patterns. The results are omitted here to save space, but are available from the authors upon request.

Note: 25 Iranian provinces, 1996-2005. Nonlinear least squares. Variables in real per capita terms. Dependent variable is the mean growth rate of demand deposits. Initial level is the initial level of demand deposits. Government investment and consumption refer to the log of per capit real initial values. Numbers in parantheses denote *t*-values.

Especially after 1990s, that implement government development projects in other provinces and their demand deposits are counted in those provinces and this cause the growth rates of demand deposits in other provinces to be higher while the incomes obtained are mainly transferred to Tehran and rich regions. This could be an explanation for the β-convergence but more polarization in Iran examined by Noorbakhsh(2005) . Third, there has been an outstanding decline in the growth rate of population in many poor regions in the past two decades as a result of economic difficulties that households have encountered. For example, households that used to have more than five children in provinces like Kurdistan, Luristan, and ChaharmahaloBakhtyari now have two children on average, even in rural regions. But the decline in Tehran and other rich provinces had taken place earlier. As a result of the sharp decline in the growth of population in the past two decades, their growth rates of per capita demand deposits have been higher that can not continue in the future. Fourth, there has been a surge in illegal imports and smuggling in some poor regions like Kurdistan and Systanobaluchestan (not just related to drugs but also gasoline, cloths, durable goods, ect.) that has caused an increase in economic activities related to those illegal activities and therefore demand deposits without significant positive effects on the development of those regions.

The exclusion of Tehran leads to a slightly higher speed of convergence (III). Eventually, this may be seen as weak indication that a concentration of rent-seeking activities in the capital can work as an impediment for the convergence process. Nevertheless, the differences are hardly significant.

To gain further insights into the role of rent-seeking, the basic specification is extended by policy instruments, see the models II and IV in table 1. In particular, the initial values of per capita public consumption and

investment are chosen as additional explanatory variables.[1] In contrast to demand deposits, public expenditures have not converged. Over the sample period, the coefficient of variation has been roughly constant in case of consumption, and has increased by 50 percent in case of investment.

According to the adjusted R-squared and the SBIC information criterion, the model fit is improved. Both expenditure categories reveal a positive impact on the subsequent growth experience. Their influence seems to be long lasting, as economic growth is the average rate of the next decade. While beta convergence is still confirmed in the extended equation, the inclusion of policy measures reduces the speed of convergence. In sum, there is some evidence of higher dispersion due to policy instruments, which might be rationalized by rent-seeking activities.

Of course, these empirical results are mainly indirect indicators for rent-seeking and a potential area of research will be finding some more direct indicators.

6- Conclusions

This paper has analysed regional economic convergence using a sample of Iranian provinces. The analysis is based on demand deposits as a proxy for regional GDP. In addition, the impacts of rent-seeking on convergence are explored. Due to the lack of high quality data some indirect insights are provided. The results indicate that the provinces converge in the sigma and beta sense. At the same time, the presence of rent-seeking activities seems to weaken the convergence process. The impact of rent-seeking tends to be higher if there is an increase in government expenditures which provides the opportunity for more rent-seeking. An important topic for future research is the development of reliable indicators for rent-seeking to investigate the linkages between this kind of behaviour and the real economic performance in more detail.

1- The standard measures to control for individual steady states are either not available at a regional level (savings) or largely insignificant (population growth).

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