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Pattern and determinants of public budget allocation to border regions in Iran

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ABSTRACT

The historical centripetal behavior of the government has made the border regions as periphery of the central areas in Iran. The regional disparities in Iran root in the economic structure of the country. Iran is one of the main exporters of petroleum and natural gas. The huge revenues of natural resources have reduced the dependence of central government to domestic economic activities and made Iran one of the closest economies in the world. This paper studies the pattern and determinants of public budget allocation to the border regions in Iran over the period 1989–2007. The results show that different characteristics of the border provinces such as geographical position, economic conditions, type of borders, distances from the capital, and natural resource richness influence the level and trend of their realized budgets.

Keywords: Border regions, Provincial budgets, Iran, Panel data

JEL Classification: C33, O53, R51, R58

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I. Introduction

Attention to the border regions has increased due to their severe economic, social, and political problems and isolation of these areas from the rest of countries. In the economic literature, trade theory, traditional location theory, and the new economic geography have studied the role of border areas in the regional, national, and international economies. Since traditional trade models regarded nations as dimensionless points in space, Ohlin (1967) integrated theories of location and international trade and found that the results on international trade can be applied to interregional trade relations as well. Rauch (1989) combined elements from urban economics and trade theory and proved that proximity of border regions to foreign markets is advantageous for firms that export goods to these markets and might encourage economic development.

In contrast to trade theory, location theory is about location decisions. Based on the ideas of the traditional location theorists, such as Lösch (1998), Giersch (1988), Guo (1996) and Heigl (1978), the border regions are disadvantageous areas since borders limit the physical flows of goods. Hoover (1963) concludes that due to the tariff and other restraints on international trade, firms orientate towards the interior of the countries. Hence, the network of a firm's demand and supply is denser in the geographical center of a country than in its periphery. Totally, traditional location theory implies that border regions display weaker development within a closed economy.

The new economic geography deals with the distribution of economic activities across space and explains regional disparities by entirely endogenous location decisions. In this set of theories, spatial equilibrium results from the location decisions of firms and workers (Fujita et al., 2001; Krugman, 1992). The balanced distribution of workers and firms across space depends on the relative strength of centripetal forces (which promote the geographic concentration of economic activities) and centrifugal forces (which promote the geographic dispersion of economic activities). Centripetal forces arise from the numerous backward and forward linkages related to production and consumption within a country. On the other hand, centrifugal effects can be based on relative scarcity of immobile production factors and non-tradable goods in the agglomerations as well as on the existence of pure external diseconomies of agglomeration (Junius, 2000; Puga, 1999). Economic prosperity or isolation of border regions is the resultant of these contradictory forces.

When globalization and international trade empowers the centrifugal forces and integrate the border regions to a bigger cross-border, interregional or international markets, some of the developing countries suffer the trade and economic closeness, lead to victory of centripetal forces in them. The main consequence of centripetal behavior is that areas along the borders are considered the edges of the community and consequently periphery of the mainland for different reasons (Gottmann, 1980; Rokkan and Urwin, 1983). First, the territorial center wishes to secure itself against undesired influences from the outside and the security occurs at the borders. In this sense, large and politically important cities are rarely located in the direct vicinity of a country's borders. Instead, trade and commercial centers are moved to the borders to use the cost advantages. In addition, border regions are zones of cultural overlap between two neighboring countries. When the national identity and loyalty are affected usually by the overlap effect in border regions, inhabitants of the home country often consider them as cultural peripheries and neighboring countries regard the inhabitants of these areas as foreigners (Augelli 1980). Moreover, the influence of the border regions in national politics and policies is most often limited. Finally, the center-periphery relationship also reigns in economic matters and is recognizable in the often unbalanced division of wealth between the center and the periphery of a country (Hansen, 1977; 1983).

Iran is a country with historical centripetal government and severe regional disparities, especially between border and central areas. Undoubtedly, one of the reasons of the regional disparities in Iran is the economic structure of the country. Iran is one of the top holders of both proven oil and natural gas reserves and is the second-largest producer and exporter of petroleum in OPEC (EIA, 2010). In the last decades, the export revenues of crude oil and recently natural gas were the main sources of the public budget, composed more than half of the total public budget (SCI, 2010). The huge revenues of natural resources have reduced the dependence of central government on domestic economic activities and made Iran one of the closest economies in the world. Regarding the index of economic freedom, Iran has the 171th freest economy in the 2011 index. As the last Heritage report states, "heavy state interference in many aspects of private economic activity has resulted in economic stagnation in Iran's non-oil sector and a serious lack of overall economic dynamism. A restrictive business and investment environment continues to hamper private-sector development. More than 500 companies remain state-owned, and privatization has been negligible in the past year" (Miller and Holmes, 2011, p.223).

The current paper studies the pattern and determinants of public budget allocation to the border regions in Iran. Therefore, three econometric panel data models are specified which examine the status of border provinces in the process of provincial budgeting in Iran over the period 1989–2007. The results show that different characteristics of the border provinces such as their geographical positions, economic conditions, type of borders, distances from the capital, and natural resource richness influence the level and trend of their realized budgets.

II. Border disparities in Iran and the role of public budgets

Iran is a country in Central Eurasia and Western Asia with a population of over 74 million (SCI, 2010). It is a country of particular geostrategic significance because of its location in the Middle East and Central Eurasia. Iran is subdivided into 31 provinces, each governed by a local center, usually the largest city. A Governor-General appointed by the Minister of the Interior, subject to approval by the cabinet, heads the provincial authority.

Iran is ethnically and religiously diverse. The Persians are the majority ethnic group by a slight margin. According to reports by international institutions, the ethnic/racial composition of Iran is as follows: Persian 51%, Azeri 24%, Gilaki and Mazandarani 8%, Kurd 7%, Arab 3%, Lur 2%, Baloch 2%, Turkmen 2% and other 1%. Among the different ethnicities, Kurds, Balochs, Turkmens, and a group of Arabs are Muslim Sunnis. The official religion in Iran is Shiite Islam. Although Shia Muslims are the majority (89%), the country is home to many religious minorities such as Sunni Muslims (9%), Christians, Zoroastrians, and Jews (Hassan, 2007). Figure 1 shows the distribution of major ethnic and religious minorities in Iran at 2004. As it is obvious, most of the ethnic and religious minorities are located in the border regions.

[Figure 1 around here]

Iran’s total boundaries are 7816 km in length, which is one of the longest national boundaries. Along the diversified land and maritime borders, 15 neighboring countries are located showing the particular geopolitical position of Iran. Iran shares its northern borders with three post-Soviet states: Armenia, Azerbaijan, and Turkmenistan. Iran's western borders are with Turkey in the

north and Iraq in the south. The Persian Gulf and Gulf of Oman littorals form the entire southern border. To the east lies Afghanistan on the north and Pakistan on the south. Due to the long boundaries, 16 provinces, i.e. about half of the total provinces, are located in border regions. Various wars, crises, and tensions in the neighboring countries have dramatically impressed the border regions of Iran politically and economically. Some of these crises are the Iran-Iraq war (1980–1988), two Persian Gulf wars (1990–1991 and 2003), the war in Afghanistan (2001–present), collapse of the Soviet Union and separation of its states (1991), terrorism in Afghanistan and Pakistan and smuggling drugs from their borders, flowing the refugees inward the country after each war, etc..

Historically, the border regions in Iran have suffered from the weakness of infrastructures, shortage of investment in economic sectors, various social and economic inequalities, fewer living standards relative to the average national level, and peripheral status in the policies and decision-making processes of the central government. Studying the different economic, social, cultural, and political indicators shows that Iran has followed the center-periphery pattern in all of its national, regional, and local scales. When the central provinces are relatively more developed, their gap is increasing by the heterogeneous characteristics of the border provinces. Table 1 shows the development degree of the provinces in Iran based on the elements and the final amount of the provincial human development index (HDI) at 2000–2001 (Bakhtiari et al., 2006). As the indices show all of the border provinces except Gilan and Mazandaran can be located in the groups of less and least-developed provinces. When the highest ranks in provincial development belong to Tehran, Esfahan, and Gilan, the least-developed provinces are Sistan va Baluchestan, Kurdestan, and west Azarbaijan, all located in the border regions. The interesting point is locating two border provinces and northern neighbors of Tehran province, i.e. Gilan and Mazandaran, among the top developed regions in Iran. In addition, some central less-developed provinces can be found which are indeed the second-order boundary regions, i.e. neighbors of the border provinces.

[Table 1 around here]

The government is the major player that can mitigate the regional disparities between center and periphery in Iran. It is adopting top-down policies and central budgeting as a panacea for lagging areas. In the literature of local and regional development, top-down policies consist of

supply-led plans, either to provide infrastructure or attract industries and foreign direct investment. This is known as the industrial recruiting strategy (Blair, 1995; Kuklinski, 1970). Usually, these policies have been structured along two axes (Aschauer, 1989). The first is infrastructural endowment in the belief that improving accessibility is the solution for lagging areas, and the huge investment can be justified by the higher returns. The second axis is industrialization, based especially on Perroux's (1957) development pole theory. There are several success stories about the attraction of large firms to less-developed regions and improved economic conditions in lagging areas; however, failure stories are more common (Agnew, 2000). Researchers have mentioned a variety of causes for the failure of top-down policies. Some examples include deficient education and skills among people and communities, weak local economic structures, poorly suited social and institutional contexts, internal imbalance of most traditional development policies, and replication of standardized development policies in various areas of the world regardless of their particular local economic, social, political, and institutional conditions (Camagni, 1992; Higgins and Savoie, 1998).

Apparently, top-down policies and a central budgeting scheme have failed in Iran too. When globalization motivated nations to shift to bottom-up decision-making structures and evolve the structures of their government and governance into multiple levels (Scott and Storper, 2007; Stimson et al., 2006; Taylor and Wren, 1997), the Iranian government (state) was reluctant to change its structure. Undoubtedly, decentralization for the government officials meant sharing power with the people and consequently reducing the central government’s authority.

Based on the budgeting law, the provinces must send their revenues to the central government, which redistributes the budget to the provinces. Although municipalities have been excluded from this law since 1999, they remain dependent on the financial support of the government. Since the fourth five-year national development plan (NDP) of Iran, the government has had to allocate the budgets according to approved provincial land-use plans. However, based on a parliamentary report, the government of President Ahmadinejad has violated 75% of the NDP articles. This means that the drivers determining the budget allocation in Iran are political rather than legal or economic.

The provincial budget, which consists of consumption and investment budgets, is a regional development tool under the control of the Iranian government. The provinces that receive more funds have an opportunity to improve infrastructure, lure new industries, and consequently create

new job opportunities for their inhabitants. For the less-developed provinces, receiving more funds means narrowing the development disparity gap. Therefore, provincial budgeting is the object of provincial competition and occasionally disputes among the inhabitants and local and national officials of the provinces. This phenomenon is known among researchers as a win–lose game (Drabenstott, 2005). In the next section, we will study the role of central government in this game by studying the impact of geographical position of the border provinces on their realized budgets.

III. Pattern of budget allocation to the border provinces

a. Data and structure of the models

As mentioned before, the impact of geographical location of the border provinces on their realized public budgets will be studied in this section. Data on the provincial public budgets in Iran (consumption, investment, and total) have been reported annually in the Statistical Yearbook since 1983, and can be accessed from the website of the Statistical Center of Iran (SCI, 2010). However, because of the economic structural break during the Iran–Iraq war (1980–1988), the period of study was shortened to 1989–2007. Through this time, the number of provinces increased from 26 to 31 because of division of some large provinces into two or three smaller ones. Therefore, data availability for 31 provinces for the period 1989–2007 yields three unbalanced panel data models consisting of 507 observations. Eq. (1) shows the general structure of the econometric models. The logarithm variables are shown in small letters.

$$\begin{bmatrix} consumption\_exp_{it} \\ investment\_exp_{it} \\ total\_exp_{it} \end{bmatrix} = C + \Phi_{3\times4}\begin{bmatrix} oil\_va_{it} \\ openness_{it} \\ popdens_{it} \\ unemployment_{it} \end{bmatrix} + \Omega_{3\times2}\begin{bmatrix} BORDER_{it} \\ BORDER\_EXC_{it} \end{bmatrix} + \Gamma_{3\times4}\begin{bmatrix} NORTH_{it} \\ SOUTH_{it} \\ EAST_{it} \\ WEST_{it} \end{bmatrix} + \Theta_{3\times3}\begin{bmatrix} EARTHQUAKE_{it} \\ WAR_{it} \\ TREND_{it} \end{bmatrix} + U_{it} \quad (1)$$

Table 2 explains the variables of Eq. (1). In our panel data models, different explanatory variables including geographical location of the provinces, i.e. border vs. central, are intended to describe the amount and trend of the provincial consumption, investment, and total budgets.

When one of the main targets of any development plan is improving the quality of human life, per capita provincial budgets provide a better explanation of the level of budget funding received. In addition, this conversion from budget funding level to budget per capita makes the data comparable (Rodriguez-Oreggia and Rodriguez-Pose, 2004). To avoid bias, data are adjusted to constant 2004 prices.

[Table 1 around here]

Comparison of real budgets per capita reveals a high degree of variation among the provinces throughout the period of study. Such variation reveals whether different governments have followed a common policy and strategy to develop the provinces or if each has determined the budgets according to temporary and unstable considerations. Figures 2 and 3 show the variation in the per capita budgets according to time and location, respectively. Figure 2 reveals that the greatest variations in received per capita budgets were experienced in 1993 and 2006. The year 1993 was the final one of the first presidential term of Hashemi Rafsanjani who was a candidate in the subsequent presidential election. Simultaneous to raising oil revenue, his government decided to increase the budgets to accelerate the progress of incomplete projects. The year 2006 was the first year of President Ahmadinejad's administration. In 2006, the government applied unexpected fiscal and monetary expansion policies that increased the inflation rate dramatically. Compared with the previous year, the public budget grew by approximately 30%.

[Figure 2 around here]

Figure 3 shows that variation among budget funds allocated to the provinces is strong, particularly in the less-developed provinces. Whereas the per capita investment and total budgets have experienced strong variation, the per capita provincial budgets were allocated more evenly, especially in the period 1995–2002. From a general perspective, three less-developed border provinces (Ilam, Bushehr, and Kuhkluye va Boyerahmad) experienced the highest variation in their received budgets. On the other hand, the budgets allocated to the four main provinces (Tehran, Esfahan, East Azerbaijan, and Khorasan) have been systematically increased with minimum variation since the war with Iraq.

[Figure 3 around here]

To increase the explanatory power of the panel data models and avoid spurious estimation, three control variables were included in the models: *oil_va*, *openness*, and TREND. The variable *oil_va* is the real per capita value added in the oil sector. In recent years, the export revenues of petroleum, natural gas, and petrochemical products have comprised more than 80% of the public budget of the Iranian government. Therefore, this variable can accurately predict the level and trend of the provincial budgets. The *openness* variable, which is the ratio of exports + imports to GDP, shows the degree of trade openness in Iran. Because different studies have found trade openness to be a key driver of GDP level, it can explain fluctuations in the provincial budgets. Finally, the variable TREND preserves the model from bias from the increasing trend of some variables.

The areas with large population bottlenecks usually require more resources and public services. If the government's development strategy is human oriented, it allocates more funds to heavily populated areas. In contrast, if the only target of the government is physical development, the geographically larger provinces will receive more per capita funds. To account for this effect and understand the public target, the *popdens* variable was added to the model to represent the population density of the provinces.

One of the best variables representing the economic conditions of the provinces is the unemployment rate. The unemployment rate reveals the level of investment and consequently new job opportunities in the provinces. In the local and regional development literature, the unemployment rate is a quantitative indicator of economic development. Undoubtedly, this variable, calculated from qualitative economic indicators such as job sustainability and income level, provides a clearer economic picture of the provinces. However, the lack of qualitative supplementary data restricted us to quantitative data such as the unemployment rate. A positive and significant coefficient indicates a government tendency to favor the provinces with more severe economic conditions.

To study the status of border provinces in provincial public budgets, three sets of dummy variables are added into the Eq. (1). The first dummy variable is BORDER that indicates the entire 16 provinces located along the land and maritime borders. The magnitude and significance

of the variable's coefficient show the centripetal or centrifugal behavior of the central government in terms of provincial budgets. Regarding the less development of the most border provinces, the significant and positive coefficient will be an optimistic sign for attention of the government to the peripheral regions of the country over the period of study.

Among the border provinces, two provinces are the outliers, i.e. Gilan and Mazandaran. In Table 1, Gilan and Mazandaran rank the third and ninth developed provinces of Iran at 2000–2001, respectively. These two provinces are the northern neighboring provinces of the capital, i.e. Tehran. Locating beside the capital by population near to 10 million people and alongside the coast of Caspian Sea, made these provinces the destination of numerous domestic tourists. In addition, these two provinces are the providers of agricultural products for the rest of country. Therefore, these provinces have the advantages that the other border provinces have not. To avoid any bias, a new dummy variable, i.e. BORDER_EXC, is created and Gilan and Mazandaran are removed from the list of border provinces there.

Moreover, it is interesting to study whether the specific geographical location of the border provinces affect their budgets. As explained before, most of the northern and southern provinces have natural borders. In addition, the economic, social, and even cultural features of the border provinces are completely different. For instance, most of Sunni Muslims, which are the biggest religious minority, are settled alongside the western, eastern, and southern provinces, whereas the inhabitants of the northern provinces are mostly Shia Muslims. In order to consider the location of the provinces, four dummy variables NORTH, SOUTH, EAST, and WEST are defined, each one shows a set of provinces along the horizontal and vertical borders.

Over the research period, two events affected the allocated provincial budgets. The first was the Iran–Iraq war lasting from September 1980 to August 1988. The war began when Iraq launched a simultaneous invasion by air and land into Iranian territory. Throughout the war, all the western provinces were occupied partially. Consequently, the majority of the reconstruction budget funds were allocated to these provinces after the war. To consider the budget increases in these provinces, the dummy variable WAR is defined as having a value of 1 for the five western provinces (West Azerbaijan, Kurdestan, Kermanshah, Ilam, Khuzestan) for the first six years of the research period.

The second type of event was natural disasters, mostly earthquakes, which killed and injured many people and demolished vast areas. Five destructive earthquakes occurred during the

research period. The first was the Manjil-Rudbar earthquake, which damaged two northern provinces, Gilan and Zanjan. This destructive earthquake killed 50,000 and injured 60,000 people, leaving 500,000 people homeless. The second was the 1997 Ardabil earthquake. At least 1,100 people were killed, 2,600 injured, 36,000 left homeless, 12,000 houses damaged or destroyed and 160,000 head of livestock killed in the Ardabil province. South Khorasan was struck by a major earthquake, known as the Qaen earthquake, in 1997. It killed 1,567 and injured over 2,300 people. It left 50,000 homeless and damaged or destroyed over 15,000 homes. The 2002 Bou'in-Zahra earthquake occurred in Qazvin province in 2002. The earthquake killed at least 261 people and injured 1,500 more. The best-known major disaster after the Manjil-Rudbar earthquake was the Bam earthquake, due to its magnitude, casualties, and destruction of the historical city. With the moment magnitude of 6.6, the earthquake was particularly destructive, with the death toll amounting to 26,271 people and injuring an additional 30,000. To consider the impact of these disasters on provincial budgets, the dummy variable EARTHQUAKE indicates the provinces damaged at the time of occurrence and the following year.

The precondition for every time series or panel data estimation is a test for the presence of unit roots in the variables. Levin et al. (2002) develop a unit root test for panel data. More recently, Im et al. (2003) propose a between-group panel unit root test that permits heterogeneity of observations. Maddala and Wu (1999), Breitung (2000), and Choi (2001) also propose panel unit root tests. Table 3 shows the results of the unit root tests for the dependent and explanatory variables for the level and logarithmic forms. The null hypothesis in all of the tests is the existence of a unit root. The results reveal that the null hypothesis cannot be rejected when the level of variables are used. However, taking the logarithm makes the variables stationary, and hence, the logarithmic forms of these specific variables are used in the model instead.

[Table 2 around here]

b. Interpretation of the results

In this section, the results are estimated and interpreted after introducing the structure of the model and ensuring the stationarity of the data. To estimate our unbalanced panel data model,

two common approaches were applied: fixed effects and random effects. These approaches suffered from an autocorrelation problem that made the results unreliable. To solve it, the third approach, i.e., seemingly unrelated regression for panel data, was used. This method was developed to remove autocorrelation and heteroscedasticity problems from the residuals of panel data models. Table 3 shows the estimation results of 15 panel data models with real per capita consumption, investment, and total budgets as dependent variables including and excluding different geographical dummy variables.

First, it is interesting to explain the results of the control variables. As Table 4 shows, *oil_va* provides a strong explanation for the level and trend of real per capita investment and total budget funds. The results evidence that by increasing the value added of the oil sector by 1%, provincial investment and total budgets increase by 2.2% and 0.7%, respectively. On the other hand, it cannot predict provincial consumption expenditure, because the government has committed to financing its personnel and subset organizations regardless of increases or decreases in the crude oil price in the global market. The previous findings, in addition to greater variation in the realized provincial investment budgets (Fig. 3) suggest that what flows as investment funds to the provinces is the residual of the total budget. In fact, the government is funding its commitments first and then investing the remainder of the budget in the provinces. The other control variable is *openness*, representing the degree of trade openness in the economy of Iran. Table 4 clearly shows that this variable can explain the level of all three dependent variables. When the *openness* variable is in the logarithmic form, its coefficient expresses the elasticity of the provincial budgets in relation to openness of national trade. The results reveal that a 1% increase in the share of imports and exports in national GDP increases the real per capita consumption, investment, and total provincial budgets by approximately 0.5%, 0.9% and 0.6%, respectively.

As mentioned above, the *popdens* variable is used to test whether provincial budgets in Iran are allocated according to population or geographical criteria. Contrary to our hypothesis, all of the *popdens* variables receive negative coefficients. These findings indicate that if the population density increases by 1% in an Iranian province, the government reduces its consumption, investment, and total budgets by averagely 0.16%, 0.26%, and 0.17%, respectively. This means that the government allocates more funds to larger provinces and punishes the more crowded

ones. In other words, the government strategy in regional development of Iran is based on land area rather than population.

Studying the results about the border provinces provide interesting findings. What the coefficient of variable BORDER shows is the attention of the central government to the border provinces in terms of the investment budgets. It means that the government does not make any difference between the border and central provinces when it allocates the consumption budgets. When in a closed economy such as Iran government is the bigger employer, this result for a less developed border province means lower job opportunities for the inhabitants. This is one of the reasons among many that the most of border provinces have higher unemployment rates. In addition, increasing of the investment budget has not been enough to make any superiority for the border provinces in terms of total budgets.

The negative but insignificant coefficients of the variable BORDER raise the concern that homogenizing the set of border provinces makes the above negative coefficients significant. Therefore, the new dummy variable BORDER_EXC is defined that neglects two developed border provinces, i.e. Gilan and Mazandaran, from the set of border provinces. As Table 4 shows, removing Gilan and Mazandaran from the list has two consequences. First, it increases the absolute magnitude of the negative coefficient in the consumption model and makes it significant. Second, it declines the magnitude of the significant coefficient in the investment model. Although in the total budget models, the negative coefficient of BORDER_EXC is bigger in absolute term, it is still insignificant. Removing the developed provinces from the set of border provinces, the models show that the government pays less consumption budgets and more investment budgets to the border provinces relative to the central ones.

When homogenization of the set of border provinces made the results more accurate, it is interesting to investigate the results in the new sets of northern, southern, eastern, and western provinces, which are more homogenous. As Table 4 shows, the central government allocates the budgets to the border provinces differently. Indeed, the worst position belongs to the eastern border provinces, i.e. Sistan va Baluchestan, and south, north, and Razavi Khorasans, which receive less consumption, investment, and total budgets relative to the central provinces. The southern provinces, which are mostly the richest in terms of hydrocarbon resources, receive higher volume of the investment budgets probably due to the need of central government to extract their natural resources. However, a part of this increase has been compensated by

reduction of their consumption budgets. The results for the dummy variables NORTH and WEST show the positive attention of the central government to these provinces in terms of consumption and investment budgets, respectively.

The results for the dummy variable EARTHQUAKE are interesting. The models C1 to C5 do not show any impact of an earthquake on the realized consumption budgets of the affected provinces. Models I1 to I5 show the positive impact of an earthquake on the amount of provincial investment budgets, an increase of 10%. This impact increases when we separate the border provinces in four location dummy variables. Models T1 to T3 show that increase in the consumption budgets are not very remarkable to make the impact of an earthquake on the provincial total budget insignificant. However, when we consider the different groups of border provinces, the coefficient of EARTHQUAKE becomes completely significant. These results may raise some doubts about the discriminative behavior of the central government regarding the destroyed provinces in terms of reconstruction budgets.

Models C1 to C5 show no significant impact of war on the consumption budgets of the five western provinces. However, the government increased the investment and total budgets by approximately 40%~60% and 20%~27% over the first six years of the study, respectively. The TREND variable shows positive coefficients in all of the models. This shows the increasing trend of all types of real per capita provincial budgets, progressing at a gradual rate of about 5% per year.

IV. Drivers of budget allocation to the border provinces

What found form the previous section is that generally the border regions in Iran receive less and more consumption and investment budgets relative to the central provinces, respectively. These findings are sensitive to the location of the border provinces. When the eastern border provinces get less consumption, investment, and total budgets, northern, southern, and western provinces receive higher volumes of the investment budgets. Why the government allocates the budgets to the border provinces in different ways? Which drivers affect the decisions of the central planners?

Undoubtedly, there are many geographical, economic, social, and even cultural variables can be counted that may determine the pattern of budget allocation to the border provinces. Among

the variables and regarding the data availability, three probable explanatory variables are selected and examined in the general framework of Eq. (2). The selected drivers are natural vs. artificial borders, distance to the capital, and natural resource richness. The same as Eq. (1), the variables of Eq. (2) are defined in Table 2. In addition, all of the control variables are similar to Eq. (1), explained in the previous section.

$$\begin{bmatrix} consumption\_exp_{it} \\ investment\_exp_{it} \\ total\_exp_{it} \end{bmatrix} = C + \Phi_{3\times4}\begin{bmatrix} oil\_va_{it} \\ openness_{it} \\ popdens_{it} \\ unemployment_{it} \end{bmatrix} + \Omega_{3\times3}\begin{bmatrix} NATURAL\_BOR_{it} \\ ARTIFICIAL\_BOR_{it} \end{bmatrix} + \quad (2)$$

$$(1 + BORDER_{it})\Gamma_{3\times3}\begin{bmatrix} DISTANCE_{it} \\ RES\_RICH_{it} \end{bmatrix} + \Theta_{3\times3}\begin{bmatrix} EARTHQUAKE_{it} \\ WAR_{it} \\ TREND_{it} \end{bmatrix} + U_{it}$$

The first probable drivers are the natural vs. artificial borders. All borders that have not come into existence through nature, i.e. that do not follow seas, rivers, mountains and the like, are made by human beings. Usually, such territorial borders are described as artificial, as opposed to natural borders (Rykiel, 1995). When different political causes including wars, struggles between neighboring countries, domestic crises etc. may affect all types of borders, natural borders are impressed less than artificial ones. To study whether the central government in Iran considers the border type of the provinces in allocation of the budgets, two dummy variables NATURAL_BOR and ARTIFICIAL_BOR are defined. The provinces Golestan, Gilan, Mazandaran, Khuzestan, Bushehr, Hormozgan, and Sistan va Baluchestan are the provinces with natural borders and the rest are in the group of provinces with artificial borders.

The next probable driver is the distance of the border provinces from the capital. The variable DISTANCE can be the other representative of the center-periphery theory. The center-periphery theory can be expressed in distance term in the sense that spilling the economic, social, and political problems of the neighboring provinces over the capital, force the government to put the priority on their needs. Therefore, one can claim that the provincial budgets associate negatively to the distance from the capital. This variable is examined with and without separation of the provinces into the center and border groups.

The next variable is RES_RICH, which shows the natural resource rich provinces lying on an ocean of crude oil and natural gas. Regarding the economic structure of the country, these provinces have covered the expenditures of the other provinces by their reserves for more than 50 years. As an outcome of resource curse, these provinces, i.e. Khuzestan, Ilam, Kuhkluye va Boyerahmad, Fars, Bushehr, and Hormozgan, are mostly among the poorest and less-developed provinces in Iran. For instance, when the average national annual unemployment rate was 9.7% in 1996, unemployment rate of two resource-rich provinces, i.e. Khuzestan and Ilam, were 16.2% and 16.5%, respectively. Although the rates declined to 12.9% and 13.6% until 2006, they were again over the national unemployment rate (11.22%).

Tables 5–7 show the estimation results of Eq. (2) in the provincial consumption, investment, and total budget models. Each table consists of nine models showing different specifications. The estimation results of the control variables are the same as previous. The share of value added of oil sector in total economy can explain the per capita investment and total budgets of the provinces positively. The degree of trade openness in Iran is also one of the determinants of the level and trend of the provincial budgets. The general tendency of the public budgets to the larger provinces can be viewed in the different tables. In addition, the central government pays more attention to the provinces with severe economic conditions.

Based on the results in Tables 5–7, the provinces with natural borders receive more investment budgets, whereas the provinces with artificial borders receive less total budgets. The attention to the former group can be explained based on their natural resources and the vital role of their revenues in total economy of Iran. The artificial borders are not as resource-rich as the natural borders. In addition, most of ethnic minorities along the artificial borders have couples in the neighboring countries. In fact, the artificial borders have separated Turks, Kurds, Arabs, and Baluchs in the western and eastern provinces from their couples in Azerbaijan, Turkey, Iraq, and Pakistan. This separation has been the source of many separatist activities.

As mentioned before, distance is the other representative for the central-periphery theory. When the variable DISTANCE shows the distance of the centers of provinces from Tehran, the results in models C3 and I3 reveal that farther provinces have received less and more consumption and investment budgets, respectively. Totally, these contradictory changes in the consumption and investment provincial budgets cancel out each other and make the total

provincial budgets insensitive to the distance. Therefore, it can be concluded that central-periphery theory can just be accepted in terms of consumption budgets in Iran. In the models C4, I4, and T4, the dummy variable BORDER separates the border provinces from the central ones. It is obvious that by this separation, the results lose their significance. Therefore, the previous findings about the impact of distance on the provincial budgets can be accepted only in the national scale.

As mentioned before, the economy of Iran relies on the export revenues of crude oil and natural gas. In recent decades, the export revenues of crude oil, and recently natural gas, were the main sources of public funds, comprising more than half of the total public budget (SCI, 2010). When the most hydrocarbon reservoirs are located in the border areas, it is interesting to know the treatment of the central government to these provinces. A glance to the models C5, I5, and T5 show that when the provinces are richer in terms of hydrocarbon resources, the government pays more per capita consumption, investment, and total budgets to them. However, separation of the provinces into the central and border regions reveals the other facts. The models C6, I6, and T6 show that the provinces targeted mostly with the rise of budgets are the central ones and the resource-rich border provinces are paid attention only by increasing their investment budgets.

V. Conclusion

The border provinces are among the least developed provinces in Iran, suffering the weakness of infrastructures, shortage of investment in economic sectors, various social and economic inequalities, fewer living standards relative to the average national level, and peripheral status in the policies and decision-making processes of the central government. Regarding the severe development level of the border provinces, the current paper was done to find how the central government allocated the public budgets to the border regions and which drivers affected it. To find out the pattern and determinants, different geographical and economic variables are examined.

In the national scale and regardless of the geographical position of the provinces, it is found that the strategy of Iranian government in provincial public budget allocation is based on land area rather than population. The government is sensitive to the economic conditions of the

provinces and allocates more to the provinces with higher unemployment rates. In addition, the farther provinces are receiving less and more consumption and investment budgets, respectively.

As the general pattern of budget allocation to the border provinces, it is found that the government pays less consumption and more investment budgets to the border provinces relative to the central ones, respectively. Moreover, comparing the border provinces with different geographical positions, the eastern border provinces receive less consumption, investment, and total budgets. When the southern provinces receive higher volume of the investment budgets, they receive lower consumption budgets. Finally, the results show the positive attention of the central government to the northern and western provinces in terms of consumption and investment budgets, respectively.

Among the drivers, the study found the type of borders and the resource richness as two determinants of the level and trend of the allocated budgets to the border provinces. The provinces with natural borders receive more investment budgets, whereas the provinces with artificial borders receive less total budgets. In addition, the provinces who are rich in crude oil and natural gas receive more per capita consumption, investment, and total budgets. However, it is found that the provinces targeted mostly with the rise of their budgets are the central ones and the resource-rich border provinces are paid attention only by increasing their investment budgets.

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Table 1

Human development index for the provinces of Iran (2000-2001)

Name of province	Geographical position	Health	Education			Living standards				Human Development Index (HDI)	Ranking
		Life expectancy	Adult literacy rate (% ages 15 and above)	Share of the primary, secondary, and tertiary students in the total population of these age groups	Education Index	Annual household expenditure (thousand IRR)	Family size	Income per capita (USD)	Income Index		
Tehran	Center	0.750	0.900	0.856	0.886	36,715	2.70	1167.40	0.395	0.682	1
Esfahan	Center	0.747	0.838	0.848	0.841	22,451	4.00	660.30	0.308	0.634	2
Gilan	Border	0.750	0.786	0.831	0.798	25,993	3.80	804.70	0.293	0.632	3
Yazd	Center	0.740	0.833	0.840	0.834	21,388	4.10	613.70	0.282	0.626	4
Semnan	Center	0.728	0.844	0.869	0.852	18,555	3.80	574.40	0.289	0.624	5
Qom	Center	0.727	0.801	0.816	0.806	25,861	4.10	742.10	0.284	0.622	6
Qazvin	Center	0.723	0.807	0.769	0.794	25,618	4.10	735.10	0.300	0.620	7
Fars	Center	0.725	0.820	0.817	0.819	21,892	4.30	598.90	0.321	0.614	8
Mazandaran	Border	0.715	0.805	0.806	0.805	22,991	4.00	676.20	0.286	0.613	9
Markazi	Center	0.713	0.783	0.817	0.794	22,445	3.90	677.10	0.286	0.609	10
Kerman	Center	0.697	0.787	0.830	0.802	23,233	4.40	621.20	0.274	0.601	11
Bushehr	Border	0.708	0.793	0.784	0.790	22,710	4.60	580.80	0.262	0.597	12
Khuzestan	Border	0.717	0.811	0.765	0.796	22,494	5.20	508.90	0.293	0.595	13
Ilam	Border	0.677	0.765	0.818	0.783	28,913	5.10	666.90	0.277	0.592	14
Golestan	Border	0.698	0.773	0.822	0.789	20,576	4.60	526.20	0.259	0.588	15
East Azarbaijan	Border	0.710	0.755	0.747	0.752	20,982	4.20	587.70	0.291	0.586	16
Hormozgan	Border	0.705	0.750	0.774	0.758	22,974	4.80	563.10	0.266	0.584	17
Lurestan	Border	0.687	0.768	0.801	0.779	21,566	4.80	528.60	0.348	0.581	18
Khorasan	Border	0.682	0.790	0.789	0.790	18,208	4.30	498.20	0.255	0.580	19
Ardabil	Border	0.702	0.699	0.730	0.709	28,124	4.90	675.20	0.281	0.577	20
Hamedan	Center	0.698	0.762	0.760	0.762	18,325	4.30	501.40	0.265	0.576	21
Kermanshah	Border	0.690	0.754	0.790	0.766	19,972	4.60	510.80	0.218	0.576	22
Chahar Mahal va Bakhtari	Center	0.705	0.758	0.836	0.781	15,770	4.40	421.70	0.255	0.575	23

Zanjan	Center	0.695	0.732	0.754	0.739	21,395	4.60	547.20	0.235	0.573	24
Kohkiluye vs Boyerahmad	Center	0.668	0.748	0.785	0.760	22,674	5.10	523.10	0.221	0.568	25
West Azarbaijan	Border	0.690	0.693	0.713	0.700	20,162	4.50	527.10	0.259	0.556	26
Kurdestan	Border	0.647	0.668	0.733	0.690	15,741	4.70	394.00	0.202	0.522	27
Sistan va Baluchestan	Border	0.638	0.560	0.607	0.575	15,465	5.10	356.70	0.215	0.475	28

Source: (Bakhtiari et. al., 2006)

Note: Khorasan and Tehran provinces are divided into three and two provinces at 2005 and 2011, respectively. Income per capita is calculated based on 1 USD = 8500 IRR exchange rate.

Table 2

The model variables and their descriptive statistics

Variables	Concept	Dep. /Exp.	Mean	Median	Max.	Min.	Stan. Error
CONSUMPTION_EXP	Real provincial consumption expenditures per capita (million IRR)	Dep.	0.7450	0.6575	2.0602	0.0396	0.3354
INVESTMENT_EXP	Real provincial investment expenditures per capita (million IRR)	Dep.	0.3765	0.2762	2.2499	0.0249	0.3285
TOTAL_EXP	Real provincial total expenditures per capita (million IRR)	Dep.	1.1215	0.9359	4.3100	0.2355	0.6159
OIL_VA	Per capita value added of national oil sector (million IRR)	Exp.	0.6836	0.6857	0.7786	0.5827	0.0543
OPENNESS	Trade openness (import + export / GDP)	Exp.	0.4291	0.4115	0.5771	0.2753	0.0912
POPDENS	Population density of province (thousand persons per km^2)	Exp.	0.0732	0.0455	0.7249	0.0045	0.1142
UNEMPLOYMENT	Unemployment rate	Exp.	0.0446	0.0410	0.3530	0.1060	0.1161
DISTANCE	Distance of the province centers from the capital (Thousand km)	Exp.	0.6440	0.5910	1.5670	0.0000	0.3790
SUNNI	Share of Sunnis' population in the province	Exp.	0.1052	0.0065	0.9031	0.0000	0.2038
BORDER	Dummy variable for border provinces	Exp.	------	------	1.0000	0.0000	------
BORDER_EXC	Dummy variable for border provinces except Mazandaran and Gilan	Exp.	------	------	1.0000	0.0000	------
NORTHERN	Dummy variable for the provinces in the northern border	Exp.	------	------	1.0000	0.0000	------
SOUTHERN	Dummy variable for the provinces in the southern border	Exp.	------	------	1.0000	0.0000	------
EASTERN	Dummy variable for the provinces in the eastern border	Exp.	------	------	1.0000	0.0000	------
WESTERN	Dummy variable for the provinces in the western border	Exp.	------	------	1.0000	0.0000	------
RES_RICH	Dummy variable for petroleum and natural gas-rich provinces (Khuzestan, Ilam, Kuhkluye va Boyerahmad, Fars, Bushehr, and Hormozgan)	Exp.	------	------	1.0000	0.0000	------
NATURAL_BOR	Dummy variable for the provinces with natural borders	Exp.	------	------	1.0000	0.0000	------
ARTIFICIAL_BOR	Dummy variable for the provinces with artificial borders	Exp.	------	------	1.0000	0.0000	------
SEPARATIST	Dummy variable for the provinces with separative historical background (West Azarbaijan, Kurdestan, Kermanshah, Khuzestan, and Sistan va Baluchestan)	Exp.	------	------	1.0000	0.0000	------
EARTHQUACK	Dummy variables for the damaged provinces from earth quack (Ardabil, Kerman, Qazvin, Gilan, Zanjan, south Khorasan)	Exp.	------	------	1.0000	0.0000	------
WAR	Dummy variables for the most damaged western provinces through the imposed war (west Azarbaijan, Kurdestan, Kermanshah, Ilam, Khuzestan)	Exp.	------	------	1.0000	0.0000	------
TREND	A trend variable	Exp.	------	------	2007	1989	------

Table 3

The results of unit root tests for the variables in level and natural logarithmic forms

Variable in level	**Levin, Lin & Chu t**	**ADF - Fisher Chi-square**	**PP - Fisher Chi-square**	Variable in natural logarithm	**Levin, Lin & Chu t**	**ADF - Fisher Chi-square**	**PP - Fisher Chi-square**
CONSUMPTION_EXP	11.12 (1.00)	6.07 (1.00)	4.80 (1.00)	*consumption_exp*	-9.73*** (0.00)	160.43*** (0.00)	195.08*** (0.00)
INVESTMENT_EXP	11.48 (1.00)	11.72 (1.00)	9.98 (1.00)	*investment_exp*	12.88 (1.00)	152.39*** (0.00)	161.29*** (0.00)
TOTAL_EXP	7.42 (1.00)	6.81 (1.00)	4.10 (1.00)	*total_exp*	-4.24*** (0.00)	101.64*** (0.00)	109.75*** (0.00)
OIL_VA	1.91 (0.97)	15.76 (1.00)	15.76 (1.00)	*oil_va*	-5.58*** (0.00)	82.42** (0.04)	82.08** (0.04)
OPENNESS	4.47 (1.00)	7.89 (1.00)	7.89 (1.00)	*openness*	-8.62*** (0.00)	139.37*** (0.00)	139.37*** (0.00)
POPDENS	60.13 (1.00)	19.52 (1.00)	7.25 (1.00)0	*popdens*	-60.34*** (0.00)	213.67*** (0.00)	510.45*** (0.00)
UNEMPLOYMENT	1.01 (0.84)	47.60 (0.91)	51.44 (0.82)	*unemployment*	-2.99*** (0.00)	72.74* (0.06)	98.88*** (0.00)

Numbers in parentheses are the probability of acceptance of null hypothesis. *, **, and *** show the acceptance of stationarity of variables in 10%, 5%, and 1% significance levels.

Table 4

The impact of geographical location of the border provinces on their realized public budgets in Iran (1989–2007)

Dependent/ Explanatory Variables	***1) Consumption_exp.***					***2) Investment_exp.***					***3) Total_exp.***				
	Model C1	**Model C2**	**Model C3**	**Model C4**	**Model C5**	**Model I1**	**Model I2**	**Model I3**	**Model I4**	**Model I5**	**Model T1**	**Model T2**	**Model T3**	**Model T4**	**Model T5**
Intercept	-71.43*** (2.35)	-71.59*** (2.36)	-72.72*** (2.41)	-70.60*** (2.30)	-71.41*** (2.30)	-85.11*** (4.93)	-80.45*** (4.65)	-78.88*** (4.56)	-83.21*** (4.36)	-80.38*** (4.48)	-77.34*** (2.67)	-76.72*** (2.68)	-77.03*** (2.67)	-76.85*** (2.45)	-76.37*** (2.47)
oil_va	-0.02 (0.03)	-0.01 (0.03)	-0.007 (0.03)	0.01 (0.03)	0.01 (0.03)	2.26*** (0.13)	2.23*** (0.12)	2.23*** (0.12)	2.19*** (0.12)	2.21*** (0.12)	0.72*** (0.05)	0.71*** (0.05)	0.72*** (0.05)	0.71*** (0.05)	0.72*** (0.05)
openness	0.50*** (0.01)	0.50*** (0.01)	0.49*** (0.01)	0.52*** (0.01)	0.52*** (0.01)	0.84*** (0.06)	0.88*** (0.06)	0.89*** (0.06)	0.89*** (0.05)	0.90*** (0.05)	0.57*** (0.03)	0.57*** (0.03)	0.57*** (0.03)	0.58*** (0.03)	0.59*** (0.03)
popdens	-0.14*** (0.02)	-0.13*** (0.02)	-0.14*** (0.02)	-0.17*** (0.01)	-0.18*** (0.01)	-0.26*** (0.03)	-0.28*** (0.03)	-0.25*** (0.03)	-0.25*** (0.03)	-0.27*** (0.04)	-0.15*** (0.02)	-0.16*** (0.02)	-0.16*** (0.02)	-0.18*** (0.01)	-0.18*** (0.02)
unemployment	0.04*** (0.01)	0.04*** (0.01)	0.04*** (0.01)	0.06*** (0.01)	0.06*** (0.01)	0.20*** (0.03)	0.20*** (0.02)	0.20*** (0.03)	0.13*** (0.02)	0.17*** (0.02)	0.09*** (0.01)	0.09*** (0.01)	0.09*** (0.01)	0.08*** (0.01)	0.09*** (0.01)
BORDER	-------	-0.03 (0.04)	-------	-------	-------	-------	0.19** (0.07)	-------	-------	-------	-------	-0.009 (0.04)	-------	-------	-------
BORDER_EXC	-------	-------	-0.09** (0.04)	-------	-------	-------	-------	0.16** (0.08)	-------	-------	-------	-------	-0.05 (0.04)	-------	-------
NORTHERN	-------	-------	-------	-------	0.07* (0.04)	-------	-------	-------	-------	-0.05 (0.09)	-------	-------	-------	-------	-0.01 (0.05)
SOUTHERN	-------	-------	-------	-0.16*** (0.04)	-------	-------	-------	-------	0.32*** (0.10)	-------	-------	-------	-------	0.06 (0.05)	-------
EASTERN	-------	-------	-------	-0.32*** (0.06)	-0.43*** (0.07)	-------	-------	-------	-0.33** (0.15)	-0.22 (0.16)	-------	-------	-------	-0.40*** (0.08)	-0.38*** (0.08)
WESTERN	-------	-------	-------	0.01 (0.04)	-0.005 (0.04)	-------	-------	-------	0.21** (0.09)	0.29*** (0.09)	-------	-------	-------	0.03 (0.05)	0.04 (0.04)
EARTHQUAKE	-0.01 (0.01)	-0.01 (0.01)	0.01* (0.01)	-0.01 (0.01)	-0.007 (0.01)	0.09* (0.05)	0.09* (0.05)	0.10* (0.05)	0.17*** (0.05)	0.13** (0.05)	0.02 (0.02)	0.02 (0.02)	0.03 (0.02)	0.07*** (0.02)	0.06*** (0.02)
WAR	0.03 (0.03)	0.04 (0.03)	0.06** (0.03)	0.03 (0.03)	0.03 (0.03)	0.61*** (0.06)	0.47*** (0.05)	0.46*** (0.05)	0.39*** (0.05)	0.38*** (0.05)	0.27*** (0.04)	0.24*** (0.03)	0.26*** (0.04)	0.21*** (0.03)	0.21*** (0.03)
TREND	0.05*** (0.00)	0.05*** (0.00)	0.05*** (0.00)	0.05*** (0.00)	0.05*** (0.00)	0.06*** (0.00)	0.05*** (0.00)	0.05*** (0.00)	0.06*** (0.00)	0.05*** (0.00)	0.05*** (0.00)	0.05*** (0.00)	0.05*** (0.00)	0.05*** (0.00)	0.05*** (0.00)
Durbin-Watson Stat.	1.95	1.95	1.95	1.94	1.93	1.98	1.96	1.97	1.87	1.92	1.98	1.99	2.00	1.99	1.98
R^2	0.94	0.94	0.94	0.94	0.94	0.83	0.83	0.83	0.84	0.83	0.86	0.86	0.86	0.87	0.88
N	507	507	507	507	507	507	507	507	507	507	507	507	507	507	507

*, **, and *** are the significance levels of the coefficients at 10%, 5%, and 1% .

Table 5

The determinants of allocation of consumption public budget to the border provinces (1989–2007)

Dependent/ Explanatory Variables	***1) Consumption_exp.***					
	Model C1	**Model C2**	**Model C3**	**Model C4**	**Model C5**	**Model C6**
Intercept	-71.09*** (2.37)	-72.38*** (2.39)	-70.06*** (2.37)	-70.70*** (2.38)	-73.97*** (2.25)	-74.47*** (2.26)
oil_va	-0.02 (0.03)	-0.008 (0.03)	0.01 (0.03)	0.01 (0.03)	-0.06** (0.03)	-0.06** (0.03)
openness	0.50*** (0.01)	0.49*** (0.01)	0.51*** (0.01)	0.51*** (0.01)	0.48*** (0.01)	0.48*** (0.01)
popdens	-0.13*** (0.02)	-0.13*** (0.02)	-0.18*** (0.02)	-0.17*** (0.02)	-0.13*** (0.02)	-0.13*** (0.02)
unemployment	0.05*** (0.01)	0.05*** (0.01)	0.06*** (0.01)	0.06*** (0.01)	0.01* (0.00)	0.01* (0.00)
NATURAL_BOR	-0.07 (0.05)	-------	-------	-------	-------	-------
ARTIFICIAL_BOR	-------	-0.05 (0.04)	-------	-------	-------	-------
DISTANCE	-------	-------	-0.24*** (0.06)	-0.15 (0.09)	-------	-------
DISTANCE×BORDER	-------	-------	-------	-0.08 (0.06)	-------	-------
RES_RICH	-------	-------	-------	-------	0.11** (0.05)	0.18** (0.08)
RES_RICH×BORDER	-------	-------	-------	-------	-------	-0.09 (0.09)
EARTHQUACK	-0.01* (0.01)	-0.01 (0.01)	-0.01* (0.01)	-0.02* (0.01)	-0.003 (0.01)	-0.003 (0.01)
WAR	0.03 (0.03)	0.06* (0.03)	0.03 (0.03)	0.04 (0.03)	0.03 (0.03)	0.04 (0.03)
TREND	0.05*** (0.00)	0.05*** (0.00)	0.05*** (0.00)	0.05*** (0.00)	0.05*** (0.00)	0.05*** (0.00)
Durbin-Watson Stat.	1.93	1.94	1.97	1.96	1.93	1.93
R^2	0.94	0.94	0.94	0.94	0.95	0.95
N	507	507	507	507	507	507

*, **, and *** are the significance levels of the coefficients at 10%, 5%, and 1% .

Table 6
The determinants of allocation of investment public budget to the border provinces (1989–2007)

Dependent/ Explanatory Variables	***2) Investment_exp.***					
	Model I1	**Model I2**	**Model I3**	**Model I4**	**Model I5**	**Model I6**
Intercept	-88.91*** (5.05)	-82.09*** (4.76)	-86.05*** (4.86)	-81.65*** (4.72)	-90.13*** (4.61)	-87.26*** (4.50)
oil_va	2.26*** (0.13)	2.25*** (0.13)	2.22*** (0.13)	2.23*** (0.13)	2.20*** (0.12)	2.20*** (0.12)
openness	0.80*** (0.06)	0.86*** (0.06)	0.83*** (0.06)	0.87*** (0.06)	0.81*** (0.05)	0.84*** (0.05)
popdens	-0.27*** (0.03)	-0.27*** (0.03)	-0.21*** (0.04)	-0.25*** (0.04)	-0.23*** (0.03)	-0.22*** (0.03)
unemployment	0.17*** (0.02)	0.20*** (0.02)	0.18*** (0.02)	0.20*** (0.02)	0.11*** (0.02)	0.12*** (0.02)
NATURAL_BOR	0.27*** (0.08)	-------	-------	-------	-------	-------
ARTIFICIAL_BOR	-------	0.06 (0.08)	-------	-------	-------	-------
DISTANCE	-------	-------	0.23* (0.12)	-0.01 (0.19)	-------	-------
DISTANCE×BORDER	-------	-------	-------	0.21 (0.13)	-------	-------
RES_RICH	-------	-------	-------	-------	0.42*** (0.07)	0.25** (0.12)
RES_RICH×BORDER	-------	-------	-------	-------	-------	0.29** (0.14)
EARTHQUACK	0.11** (0.05)	0.08 (0.05)	0.10* (0.05)	0.10* (0.05)	0.15*** (0.05)	0.14*** (0.05)
WAR	0.64*** (0.07)	0.53*** (0.06)	0.61*** (0.06)	0.53*** (0.06)	0.59*** (0.06)	0.53*** (0.06)
TREND	0.06*** (0.00)	0.05*** (0.00)	0.06*** (0.00)	0.05*** (0.00)	0.06*** (0.00)	0.06*** (0.00)
Durbin-Watson Stat.	1.94	1.97	1.94	1.97	1.81	1.83
R^2	0.83	0.83	0.84	0.83	0.85	0.85
N	507	507	507	507	507	507

*, **, and *** are the significance levels of the coefficients at 10%, 5%, and 1% .

Table 7
The determinants of allocation of total public budget to the border provinces (1989–2007)

Dependent/ Explanatory Variables	***3) Total_exp.***					
	Model T1	**Model T2**	**Model T3**	**Model T4**	**Model T5**	**Model T6**
Intercept	-78.11*** (2.68)	-77.31*** (2.68)	-77.04*** (2.66)	-76.12*** (2.66)	-80.39*** (2.55)	-79.76*** (2.54)
oil_va	0.72*** (0.05)	0.73*** (0.05)	0.73*** (0.05)	0.73*** (0.05)	0.68*** (0.05)	0.68*** (0.05)
openness	0.56*** (0.03)	0.57*** (0.03)	0.57*** (0.03)	0.58*** (0.03)	0.54*** (0.03)	0.54*** (0.03)
popdens	-0.16*** (0.02)	-0.15*** (0.02)	-0.16*** (0.02)	-0.15*** (0.02)	-0.15*** (0.01)	-0.14*** (0.01)
unemployment	0.08*** (0.01)	0.09*** (0.01)	0.09*** (0.01)	0.10*** (0.01)	0.05*** (0.01)	0.05*** (0.01)
NATURAL_BOR	0.07 (0.05)	-------	-------	-------	-------	-------
ARTIFICIAL_BOR	-------	-0.09** (0.04)	-------	-------	-------	-------
DISTANCE	-------	-------	-0.04 (0.07)	0.07 (0.11)	-------	-------
DISTANCE×BORDER	-------	-------	-------	-0.10 (0.07)	-------	-------
RES_RICH	-------	-------	-------	-------	0.28*** (0.03)	0.26*** (0.06)
RES_RICH×BORDER	-------	-------	-------	-------	-------	0.05 (0.07)
EARTHQUACK	0.03 (0.02)	0.03 (0.02)	0.02 (0.02)	0.03 (0.02)	0.03* (0.02)	0.03* (0.02)
WAR	0.28*** (0.04)	0.28*** (0.04)	0.27*** (0.04)	0.25*** (0.03)	0.28*** (0.04)	0.26*** (0.04)
TREND	0.05*** (0.00)	0.05*** (0.00)	0.05*** (0.00)	0.05*** (0.00)	0.05*** (0.00)	0.05*** (0.00)
Durbin-Watson Stat.	2.00	0.86	1.98	1.97	2.00	2.00
R^2	0.86	1.99	0.86	0.86	0.87	0.87
N	507	507	507	507	507	507

*, **, and *** are the significance levels of the coefficients at 10%, 5%, and 1% .

Fig. 1

The map of Iranian provinces, 2010

Fig. 2
Variance in the provincial consumption, investment, and total expenditures by year (1989–2007)

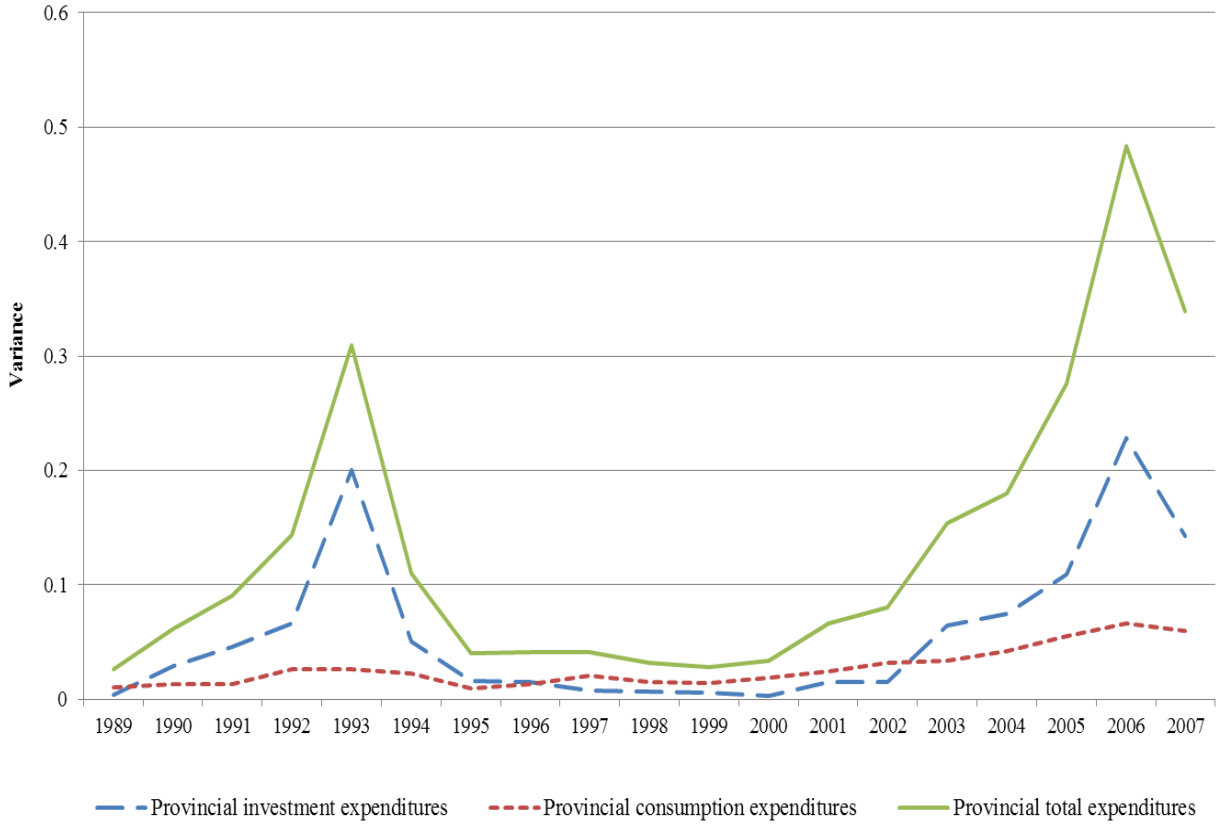

Fig. 3

Variance in the provincial consumption, investment, and total expenditures by province