RESOURCE BASED ECONOMY AND DUTCH DISEASE:
THE CASE OF MONGOLIA

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I.   INTRODUCTION

The Mongolian economy is highly dependent on mineral exports and has been governed by a history of pro-cyclical macroeconomic policies. Mongolia has demonstrated substantial economic growth resulting from the mining boom during the past several years. Indeed, mining, extraction, and exportation have been increasing substantially and have become leading sectors of the economy. Increased mining, extraction, and exportation have led to a huge influx of foreign exchange into the country, which, in turn, has created opportunities for the establishment of large-scale projects for developing the infrastructure and the social projects that contributed to national socioeconomic development. However, the aforementioned simultaneous developments in the mining sector, the infrastructure, and the social domain have also been accompanied by negative economic trends such as the decrease in the share of the GDP and total exports attributable to the non-mining tradable sector, the increase in overall price levels, and the appreciation in the real effective exchange rate.

The share of the overall GDP attributable to the mining sector increased from 8% to more than 22% during 2001–2010. Huge mining revenues, driven by high copper prices, have been the major source of the tremendous surge in government expenditures. The major portion of these expenditures has been oriented to the non-tradable sector of the economy in the form of infrastructure and social projects that facilitate national socioeconomic development. However, the simultaneous boom in the mining sector and the joint development of projects related to infrastructure and social issues has also been accompanied by some negative trends in the economy. According to official statistics, non-mineral product exports (mineral product exports) decreased (increased) from 56% (44%) of the total exports in 1997 to 19% (81%) in 2010.

Moreover, Mongolia has been suffering from the consequences of the worst decisions governing the spending of mining revenues. Every Mongolian citizen was promised 1.5 million tugrugs; although a portion of this money has been given to the citizens according to this promise, the populace have asked for the entire amount at one time. Additionally, the real effective exchange rate has appreciated by approximately 45% during 2007–2010. Given that Mongolia already has one of the fastest growing currencies in the world, this has been an area of particular concern. The main outcome of the appreciation of the real effective exchange rate was to undermine the competitiveness of the non-mining tradable sectors. Indeed, Mongilia's ability to achieve self-subsistence is minimal and the service sector has accounted for about 50% of the GDP. Because of the increase in the influence of

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the mining sector, the increased income from this sector has led to an increase in imports, which has supported the service sector. As Mongolian currency appreciates, exports become more expensive, and Mongolia's cashmere industry has been suffering from a result of currency appreciation.

Mongolia's mining sector has been a major contributor to economic growth and development. The main minerals produced are copper, gold, and coal although other minerals including iron, zinc and molybdenum are also mined. Due, in part, to the continued sharp increase in the prices of copper and gold, the mining sector accounted for 22% of the GDP and 81% of the export earnings in 2010, whereas revenues from copper, gold, and coal mining accounted for 31.7% of total government budget revenue. However, despite its overall economic importance, the mining sector accounted for only about 3% of the labor force, due to its highly capital-intensive nature.

Mongolia possesses huge copper reserves, the second-largest coal reserves, significant onshore oil and gas fields, the world's second-largest deposits of rare earths, massive gold and iron-ore reserves, and many other hugely significant deposits of minerals ranging from uranium to tungsten and zinc.

The notion of a "natural resource curse" is based on the empirical finding that resource-rich economies, on average, experience lower growth rates than do resource-poor economies (Sachs and Warner, 1995 and 2001). One explanation for this phenomenon is that the large windfall revenues from natural resources tend to lead to rent-seeking behavior and conflicts over the distribution of revenues, which, in turn, impede growth as productive resources are drawn into non-productive activities. A second explanation is that resource rents tend to be volatile, which is bad for growth. A third explanation - the one we will focus on in this paper - is that of "Dutch Disease", i.e., the hypothesis that windfall revenues from natural resources lead to appreciation in the real exchange rate, which, in turn, reduces the competitiveness of the manufacturing sector.

Several seminal studies such as those conducted by Sachs and Warner (1995), Gylfason (2001), and Gylfason and Zoega (2002) have confirmed that most of the resource-rich countries have tended to grow more slowly than countries without natural resources, and that these resource-rich economies suffer from different macroeconomic challenges that are closely related to the sector that is booming. This phenomenon became known as the "resource curse" because resource abundance seemed to be a curse rather than a blessing for such economies in these contexts. Four primary explanations have been offered for the resource curse, but the traditional approach has relied on the concept of Dutch Disease. According to Corden (1984) and Corden and Neary (1982), Dutch Disease is the appreciation of a country's real exchange rate caused by the sharp rise in exports and the tendency of a booming resource sector to draw capital and labor away from a country's manufacturing and agricultural sectors, which can lead to a decline in exports of agricultural and manufactured goods and inflate the cost of non-tradable goods.[2]

Due to Mongolia's resource abundance, it is very important to analyze its economy and the negative trends related to the booming sector from the perspective of Dutch Disease. Thus, the objective of this study is to identify any symptom of Dutch Disease in the Mongolian economy. This study may contribute to the existing literatures on Dutch Disease by investigating this issue in Mongolia. Moreover, the results of this investigation may be useful for Mongolian policy makers designing frameworks for curbing the possible effects of Dutch Disease.

The remainder of this paper proceeds as follows. Section 2 deals with explaining the natural resource curse and Dutch Disease. Section 3 is devoted to examine whether the Mongolian economy shows symptoms of Dutch Disease. Section 4 shows an empirical analysis of Dutch Disease using real effective exchange rate equation and the interpretation of the results. Concluding remarks are provided in Section 5.

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2. Hasanov, F (2008), Dutch Disease and Azerbaijan Economy, Working paper No11/03E.

II. THE NATURAL RESOURCE CURSE

The natural resource curse hypothesis is based on the observation that resource-rich economies grow more slowly, on average, than do resource-poor economies. For example, many natural resource-rich countries such as Nigeria, Venezuela, Angola, and Ecuador, have failed to prosper during the past few decades, whereas resource-poor countries in Asia have enjoyed rapid economic growth. In a well-known paper, Sachs and Warner (1995) reported a robust negative relationship between real per capita GDP growth and the ratio of resource exports to GDP in a sample of 97 developing countries during 1970–1989. This negative relationship is illustrated in Figure 1, which replicates Sachs and Warner's basic chart, with an update for 1970–2000. This surprising result has been shown to hold for a variety of measures of resource abundance and to be robust even after controlling for other possible growth determinants such as initial per capita income, trade policy, government efficiency, and investment rates.[3]

One possible explanation for the natural resource curse is that resource wealth tends to elicit conficts over existing resources, which, in turn, detract from the quality of institutions and decrease growth. This argument holds that the large rents that can be obtained from natural resources create incentives for governments and private agents to engage in rent-seeking behavior, "voracity,"[4] corruption,[5] or even civil conflict,[6] thus crowding out entrepreneurial activity and other pro-growth activities. Incentives for rent-seeking arise when the expected net payoffs from engaging in unproductive activities that appropriate existing wealth (e.g., corruption, conflict) exceed the net payoffs from engaging in productive activities that create wealth.
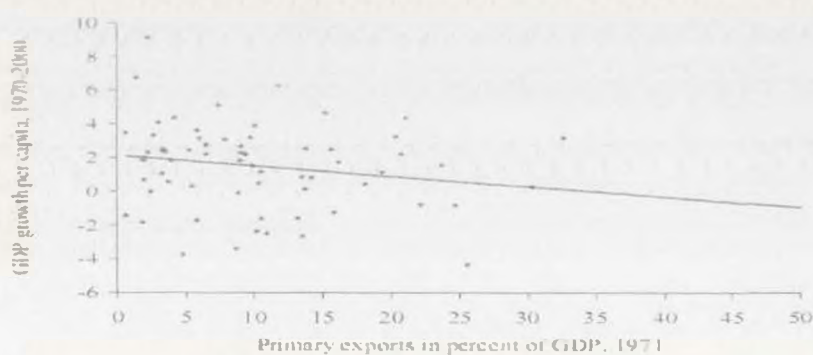
Sources: Penn World Tables, International Financial Statistics, and U.N. Comtrade Database.

Figure 1 Primary export and GDP growth per capita

Hausmann and Rigobon (2003) argued that the presence of common-pool problems or uncertainty regarding property rights related to the income from resources leads to inefficient fights over existing resources, which can generate less growth. Sala-i-Martin and Subramanian (2003), who referred to this situation as the "institutional impact of natural resources", presented empirical evidence that some natural resources (in particular, oil and minerals) exerted a robust negative and nonlinear impact

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3. Oomes, N. and Kalcheva, K. (2007), Diagnosing Dutch Disease: Does Russia Have the Symptoms? BOFIT Discussion Paper No 6.

4. The "voracity effect", a term coined by Tornell and Lane (1999), refers to a more-than-proportionate increase in fiscal redistribution following a term-of-trade windfall.

5. On corruption, Gylfason (2004) empirically found that natural resource dependence was positively related with corruption.

6. Collier and Hoeffler (2004) found a strong and nonlinear effect of the share of natural resources in the GDP on the probability of civil conflict in a country.

on growth via their deleterious impact on institutional quality.[7] In a similar study, Isham and others (2005) found that countries that export fuels, minerals, plantation crops, and coffee or cocoa perform more poorly according to an array of governance indicators, despite of controlling for other potential determinants of governance.

A second explanation for the natural resource curse is that resource rents tend to be volatile. This volatility arises in part from the typically low price elasticities characterizing the supply of natural resources. Volatility, in turn, has been shown to be negatively correlated with growth (Ramey and Ramey, 1995) and investment, including investment in education (Flug, Spilimbergo, and Wachtenheim, 1998).[8] Hausmann and Rigobon (2003) argued that the main reason for this negative effect was the existence of imperfections in the financial market that lead to a higher cost of capital, lower investment, and lower levels of well-being.

This paper focused on a third explanation of the resource curse, the hypothesis commonly known as Dutch Disease. According to Corden (1982) and Corden and Neary (1984), the Dutch Disease hypothesis can be briefly summarized as the notion that an exogenous increase in resource prices or in resource output[9] results in an appreciation in the real exchange rate and a decline in the manufacturing sector.[10]

III. THE DUTCH DISEASE

The existing literature can be divided into theory and evidence. Papers that investigate the theoretical mechanisms underlying Dutch Disease derive primarily from Corden and Neary (1982), Buiter and Purvis (1982), Corden (1984), and Edwards (1985). Corden and Neary (1982) presented the core model of Dutch Disease economies, which assumes the existence of three sectors in an economy: the booming sector (the sector with high export revenues; e.g., the mining sector.), the lagging sector (the sector that consists of the non-booming tradable sector; e.g., agriculture and manufacturing.), and the non-tradable sector. The first two sectors produce tradable goods at given world prices, whereas the third sector produces only non-tradable goods that do not depend on global prices. Theories have been used to analyze three static models that are characterized by different assumptions about the mobility of factors among sectors. The resulting literature has shown that a boom has two economic effects: a resource-movement effect and a spending effect. These effects lead to direct de-industrialization (i.e., the movement of labor from the lagging to the booming sector) and to indirect de-industrialization (i.e., the movement of labor from the lagging sector to the non-tradable sector) of the lagging sector[11].

Monetary disinflation, an increase in the international price of oil as a possible source of de-

7. Sala-i-Martin and Subramanian (2003) argued that poor institutional quality stemming from oil, rather than Dutch Disease, appeared to have been primarily responsible for Nigeria's poor long-term economic performance. From 1965 to 2000, Nigeria accumulated oil revenues of US$350 billion at constant 1995 price. Nevertheless, the population living with less than 1 U.S. dollar per day increased from about 36% in 1970 to just under 70% in 2000.
8. However, other studies have also found a positive correlation between volatility and growth (see, e.g., Caballero, 1991).
9. Dutch Disease has sometimes been interpreted as resulting exclusively from the discovery of new natural resources, as was the case in the original eponymous Dutch case. For example, the Rutherford Dictionary of Economics gives the following definition of Dutch Disease: "The harmful consequences for a national economy of discovering natural resources, especially the decline in traditional industries brought about by the rapid growth and prosperity of a new industry. The successful new industry has high exports, creating a foreign exchange surplus and raising the country's exchange rate with the consequence that other industries of the economy become internationally uncompetitive" (Rutherford, 1992). Buiter and Purvis (1982) distinguish between the case of increases in oil prices, which have a temporary effect, and the case of oil discoveries, which have permanent effects.
10. Dutch Disease can also be caused by foreign exchange inflows in the form of international aid or loans. On Dutch Disease and aid, see Rajan and Subramanian (2005).
11. Hasanov, F (2008), Dutch Disease and Azerbaijan Economy, Working paper No11/03E

industrialization in an open economy, has been studied by Buiter and Purvis (1982). The underlying model incorporates different speeds in the adjustments of goods and asset markets, showing that the prices of domestic goods responded only sluggishly to excess demand whereas exchange rates adjusted quickly.

Corden (1984) consolidated a growing literature on booming sectors and Dutch Disease and addressed theoretical gaps (immigration; endogenous terms of trade; domestic absorption; the dynamics of spending, saving and investment) in the concept of Dutch Disease and suggested approaches to protecting the lagging sector in economies characterized by Dutch Disease.

By extending the traditional model of Dutch Disease and by studying the relationship between exogenous changes in commodity export prices and the real exchange rate in a monetary economy, Edwards (1985) concluded that booms in commodity exports can generate either an excess demand or an excess supply of money in the short term. Among the empirical papers on Dutch Disease, the well-known paper by Sachs and Warner (1997) studied the relationship between natural resource intensity and growth in the 18 resource-rich countries, using cross-country growth regressions, and found a negative relationship.

Moreover, Rudd (1996) investigated the decline in the Netherlands' manufacturing sector and in Nigeria's and Indonesia's agricultural sectors by using ordinary least-squares analysis and time-series data from 1960 to 1990. He concluded that Dutch Disease contributed to a contraction in the countries' traditional export branches. Spatafora and Warner (1995) investigated the effects of Dutch Disease in 18 oil-exporting developing countries during 1965–1989. This study found symptoms of Dutch Disease in most instances of a commodity boom, but noted that it was very difficult to disentangle the effects of Dutch Disease from those of the domestic and international macroeconomic conditions prevailing at the time of the shock.

Gylfason (2001) replicated the methodology and results of Sachs and Warner (1997) in OPEC countries. Larsen (2003) investigated symptoms of Dutch Disease in the Norwegian economy by using the structural break econometric technique and concluded that Norway, unlike other resource-rich countries, avoided Dutch Disease. Gylfason and Zoega (2002) provided empirical evidence from 85 countries from 1965 to 1998 and concluded that natural capital may, on average, crowd out physical as well as human capital, thereby inhibiting economic growth.

Olusi and Olagunju (2005) examined whether Dutch Disease was present in Nigeria. By using quarterly data from 1980 to 2003 and employing vector autoregressive (VAR) model, they revealed that this economy suffered from Dutch Disease. Lartey (2006) examined Dutch Disease in a small open economy by employing a monetary version of a two-sector dynamic, stochastic, general equilibrium model with sticky prices in the non-tradable sector and revealed that the effects of Dutch Disease occurred under a regime maintaining a fixed nominal exchange rate during a capital inflow that caused additional pressure on domestic prices. Mohammadi and Jahan-Parvar (2009) examined them in 14 oil-exporting countries by testing the integration of real oil prices and real exchange rates.

It should be noted that several recent investigations have emphasized that resource abundance is not a curse and have even promoted economic growth in the context of well-designed institutional frameworks. For example, Brunnschweiler and Bulte (2006) analyzed the institutional and constitutional aspects of resource-rich countries and concluded that resource abundance, constitutions, and institutions determined resource dependence, resource dependence did not affect growth, and resource abundance positively affected growth and institutional quality. Their main finding was that the so-called resource curse is a red herring.

As Smirnova and Kulkarni (2006) have noted, the textbook analysis of Dutch Disease has been

based primarily on the experience in industrial countries (e.g., the Netherlands, Norway, and the United Kingdom) and resource-rich developing countries (e.g., Venezuela, Indonesia, Nigeria, Mexico, etc.), but little is known about the post-Soviet transition economies. Egert (2009) pointed out that extant studies have focused only on specific aspects of Dutch Disease in post-Soviet transition economies. For instance, Kronenberg (2004) and Egert (2009) examined long-term growth. Smirnova and Kulkarni (2006) investigated the evidence for Dutch Disease by observing the export trend as well as other macroeconomic (monetary) variables in the Russian economy. Oomes and Kalcheva (2007) studied the effects of oil prices on exchange rates in Russia and Kazakhstan; Ollus and Barisitz (2007) analyzed the de-industrialization of non-energy manufacturing by comparing the growth rate of imports to that of domestic production in 13 non-oil manufacturing sectors in Russia.[12]

Egert (2009) examined the impact of oil prices on the exchange rates of the resource-rich countries of the former Soviet Union. Additionally, Oomes and Kalcheva (2007) combined the "spending effect" and the "resource-movement effect" to generate the following four testable predictions about Dutch Disease: 1) that it would lead to a decline in manufacturing growth, reflecting both direct and indirect de-industrialization; 2) that it would lead to faster growth in the non-tradable sector; 3) that it would lead to a surge in the overall wage level if labor is mobile among sectors; and 4) that it would lead to appreciation in the real exchange due to the increased relative prices in the non-tradable sector.

Opinions about whether the Mongolian economy has been suffering from Dutch Disease remain divided. Ianchovichina and Gooptu (2007) found that some of the following phenomena may also characterize Dutch Disease. Mongolia's structure of production has evolved in a way that has increased its dependence on ores and metals. The share of total merchandise exports held by primary commodities (copper, gold, coal, cashmere, flourspar, etc.) increased from 67% in 1992 to 87% in 2005, whereas the share of manufactured exports dropped from 33% to 13%. At the same time, the non-metal manufacturing base narrowed considerably, and consisted primarily of textiles and apparel. These trends reflected favorable commodity prices and the decline in the prices of manufactured goods, and suggested that Mongolia had grown successfully by increasing its specialization in products in which it had a comparative advantage.[13]

However, as a result, 1) Mongolia's economy has become more vulnerable to terms-of-trade shocks, natural disasters and environmental degradation; 2) Mongolian manufacturing firms have become less internationally competitive, and 3) Mongolia uses a scare resource - labor[14] - rather inefficiently. Indeed, Mongolia's share of all the manufactured exports in the world has declined and, with the exception of mining,[15] its value added per worker is rather low, primarily because agriculture has employed 40% of the country's labor force, whereas it contributed only 25% of the total value added. Not surprisingly, the highly capital-intensive mining sector posted significantly higher value-added figures per worker. Some may also consider these symptoms as characteristic of Dutch Disease.

By focusing primarily on only one symptom of Dutch Disease, such as appreciation in real exchange rates due to a booming sector, or by using a growth equation including the booming sector as a factor, these studies concluded that either the economy under examination had contracted or had the potential to contract Dutch Disease. However, concluding that an economy has contracted Dutch Disease by testing only one or two symptoms without checking alternative explanations or including observed evidence is not convincing. Thus, in contrast to the aforementioned studies, and consistent

12. Many studies were done to examine the impact of the terms of trade on the exchange rates of Kazakhstan, and several institutional problems related to resource abundance in Azerbaijan, Kazakhstan, Turkmenistan, and Uzbekistan.

13. Mongolia's vast mineral wealth includes more than 6,000 known mineral deposits of 80 different minerals, and Mongolia's mining sector is viewed as the engine of growth.

14. Mongolia is one of the largest landlocked countries in the world with a very low population density.

15. Labor productivity in the mining sector would be considerably lower if we include the output of artisanal miners.

with Oomes and Kalcheva (2007), this study attempts to examine systematically the symptoms of Dutch Disease by utilizing testable hypotheses.

IV. SYMPTOMS OF DUTCH DISEASE IN MONGOLIAN ECONOMY

Over the past years, high copper prices in the world commodity market have generated significant windfall revenues for Mongolia and have put the real exchange rate on a path toward appreciation. Export earnings in Mongolia are set to increase rapidly when the Oyu Tolgoi and Tavan Tolgoi mines will start production in a few years.

Mongolia, similar to many other resource-abundant economies, has suffered from a number of macroeconomic challenges closely related to the booming sector; it is in this regard that resource abundance seems to be a curse rather than a blessing. Indeed, several empirical studies have shown that resource-abundant countries tended to grow more slowly than countries without natural resources as mentioned in the above section. This phenomenon became known as the resource curse. Four main explanations of the resource curse have been offered: the Dutch-disease concept, reduced incentives to develop a non-resource portion of the economy, the high volatility of resource revenues, and the political and institutional effects of resource income. The traditional approach to the resource curse involved invoking the concept of Dutch Disease. According to Corden (1984) and Corden and Nearly (1982), a boom impacts an economy by moving resources and affecting spending. Moreover, Oomes and Kalcheva (2007) combined these two effects to generate four testable predictions about Dutch Disease mentioned above.

Following Oomes and Kalcheva (2007), this section will try to identify symptoms of Dutch Disease in the Mongolian economy based on the aforementioned four testable predictions. To avoid biased conclusions, we will simultaneously investigate other alternative factors that may have led to the observed processes. For instance, one can observe that the real effective exchange rate of the Mongolian economy has appreciated substantially since 2008. This finding can be regarded as evidence of Dutch Disease. However, at the same time, the real exchange rate may have appreciated due to other reasons, such as an increase in relative productivity in the tradable sector. Similarly, it is clear that the non-mining tradable sector grows more slowly than the non-tradable (service) sector in Mongolia, which constitutes one of the symptoms of Dutch Disease. However, this observation may also be the result of a transition effect. Moreover, higher overall wages may have derived from other factors, such as the de-shadowization (legalization) of wages or rapid growth in the productivity in sectors other than the booming sector, as emphasized by Oomes and Kalcheva (2007). Thus, one cannot definitively conclude that observed outcomes are the results of Dutch Disease unless other factors that can lead to the same phenomena are controlled, examined, and ruled out.

For the purpose of investigating the symptoms of Dutch Disease, the Mongolian economy was divided into three sectors as suggested by the underlying theory: the mining sector, the non-mining tradable sector (all non-mining industries and the agricultural sector), and the non-tradable sector (construction, transportation, communications, hotels, and other service sectors).

4.1. Deterioration in the non-mining tradable sector and expansion in the mining sector

A deterioration in a tradable sector that is not resource abundant and the development of a non-tradable sector(service sector) are major symptoms of Dutch Disease. Production shares and growth rates of mining, non-tradable, and non-mining tradable sectors in nominal terms for 2001–2010 are illustrated below in Figures 2. The service sector accounted for about 50% of the GDP, which relates to data showing that about 70% of the imports came from neighboring China, which has a less costly work force. However, non-mining sectors such as agriculture and livestock have been decreasing because of the increase in the influence of the mining sector. The mining sector exhibited substantial

and volatile growth in 2004 and 2006, but an upward trend in the rate of growth of the share of the GDP attributable to the non-tradable (service) sector and a downward trend in the rate of growth of the share of the GDP attributable to the non-mining tradable were also evident during 2005–2010.
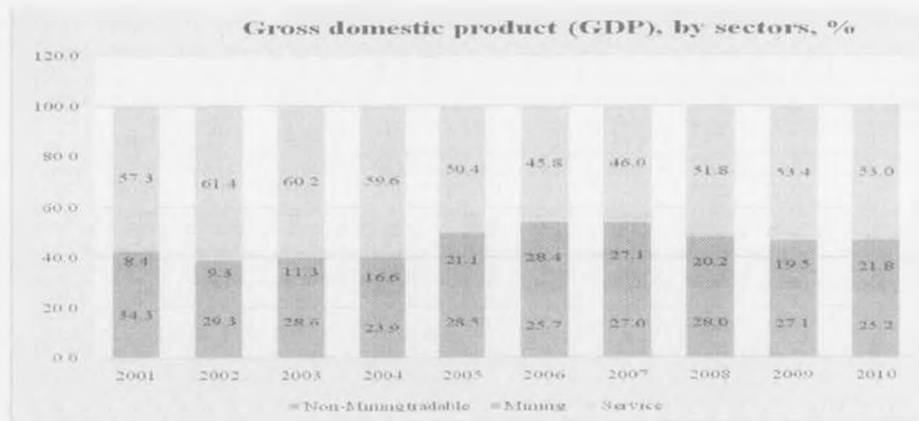

Figure 2 GDP composition by sector

Although the growth rate of non-mining tradable output has declined, negative growth rates were not observed. Hence, "relative de-industrialization" rather than "absolute de-industrialization" has been observed in the non-mining tradable sector since 2006. It is worth noting that this kind of conclusion is consistent with the results reported by Oomes and Kalcheva (2007) with reference to the Russian economy.

As Egert (2009) has noted, the first indication of possible Dutch Disease is a change in the composition of the nominal GDP. Normally in the Dutch Disease literature, the increase in the GDP share of the booming sector is not in doubt; rather, the crucial question is whether the economic share of the non-booming tradable sector is falling. Data presented in Figure 2 show that the share of the overall GDP attributable to the mining sector increased from 8% to more than 22% during 2001–2010. The performance reflected in Figure 3 may be consistent with the deterioration in the non-mining tradable sector.

4.2. Labor-force movement and government expenditures

According to the theory, because labor and capital are the main factors in production, changes in production initially derive from changes in these factors. It is important to review changes in the labor force in the sectors of interest. The dynamics of employment in all three sectors during 2001–2010 are illustrated in Figures 3. Employment growth in all sectors, especially the mining sector, was very volatile until 2006. Employment growth in the mining sector has shown a downward trend since 2008, whereas that in the non-tradable sector has demonstrated an upward trend since 2002. More precisely, employment growth in the non-mining tradable sector decreased from 2% in 2001 to -6% in 2009.
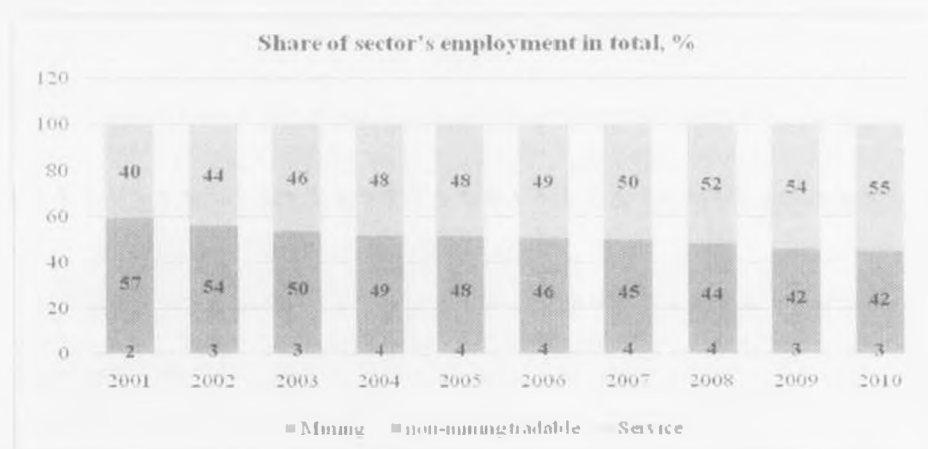

Figure 3 Share of employment by sector during 2001–2010

Therefore, one can conclude that the resource-movement effect of Dutch Disease has not been significant in the Mongolian economy because employment growth in the mining sector has not increased; on the contrary, it has followed a downward trend during 2009–2010. Note that this kind of conclusion is consistent with the finding of Oomes and Kalcheva (2007) for the Russian economy. Indeed, the mining sector in Mongolia has not been labor intensive, and significant labor mobility has existed between non-mining tradable and service sectors.

The growth rates and shares of employment in the non-tradable sector have followed an upward trend and those in the non-mining tradable sector have followed a downward trend since 2001. These observations allow the assumption that the effect of spending on the Mongolian economy has been significant. As Figure 4 shows, government spending grew sharply in 2007. Note that the revenue from the export of mineral products accounted for the biggest share of government expenditures, as indicated in Table 1.
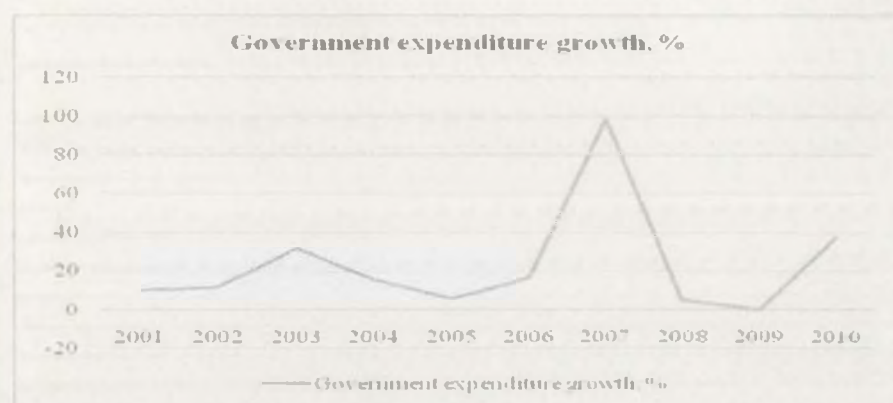

Figure 4 Growth in government expenditures, %

Table 1 Exports for selected commodity groups

	2001	2008	2009	2010
Mineral products	29%	60%	66%	81%
Textiles & textile articles	29%	9%	10%	7%
Natural or cultured stones, precious metals, jewelry	25%	24%	16%	6%
Live animals, animal products	4%	1%	2%	2%
Raw & processed hides, skins, fur & articles made from fur	10%	2%	2%	1%
Others	2%	4%	3%	2%
Total exports	100%	100%	100%	100%
Mineral products, mil tugrug	175213	1529401	1251767	2342801
GDP, mil tugrug	1391878	6555569	6590637	8255061
Mineral, share of GDP	13%	23%	19%	28%

It is impossible to analyze the budget expenditures further due to the lack of information about more recent years and additional sectors. Thus, one can assume that the spending effect has been more significant than the resource-movement effect in the Mongolian economy since 2005 based on absolute and relative increases in employment in the non-tradable sector and decreases in employment in the mining and non-mining tradable sectors. It is worth noting that our results are similar to those reported by Westin (2004) and Oomes and Kalcheva (2007) for the Russian economy. On the other hand, the infrastructural bias of government spending would not lead to income-generating activity; thus, fiscal revenues may have suffered and the economy may face recession as a result of the decrease in the mining income.

4.3. Increased wage growth in the overall economy

As mentioned above, one of the hypotheses that can be tested for the presence of Dutch Disease involves wage growth in the overall economy. Table 2 show the average wage and its rate of growth

in the economy, and demonstrates that the average wages in the overall economy have increased over time. Unfortunately, the lack of relevant information related to the average wage by sector does not allow for the testing of the spending effect.

In general, wage growth in the mining sector was characterized by substantial and volatile dynamics, probably related to the nature of copper prices in particular. On the other hand, the growth in wages in the non-mining tradable sector has been relatively minimal, whereas it was quite high in the mining sector, probably as the result of the spending effect. This assumption seems logical, as concluded above, for two reasons. First, the mining sector is more capital than labor intensive and, therefore, does not admit workers from other sectors. Second, the spending effect has been more crucial in Mongolia, which has led to high aggregate demand in the non-tradable sector.

Table 2 Monthly average wages and salaries

Year	Monthly average wages and salaries. thousand tugrug	Growth. %
2001	67 40	2%
2002	75.50	12%
2003	82 20	9%
2004	96.00	17%
2005	105.40	10%
2006	137.70	31%
2007	205.90	50%
2008	291.10	41%
2009	308 10	6%
2010	379 40	23%

Another alternative explanation is that the wage growth in the mining sector that appeared during the last few years can be explained by growth productivity in the sector. Thus, one can conclude that evidence of a rapid increase in average wages in the overall economy since 2002 exists, which is more consistent with the spending effects than with the alternatives.

4.4. Appreciation of the real exchange rate

The theory of Dutch Disease holds that the appreciation of the real exchange rate is a main symptom of this phenomenon. Therefore, a substantial portion of the relevant studies have diagnosed Dutch Disease just by testing the significance of the impact of factors related to the boom on the appreciation of the real exchange rate. For example, Oomes and Kalcheva (2007) and Mohammadi and Jahan-Parvar (2009) examined the possible effects of Dutch Disease in Russia and 14 oil-exporting countries, respectively, by analyzing the cointegration between oil prices and real exchange rates. As mentioned above, the real exchange rate has sharply appreciated during recent years. Figure 5 shows that the real effective exchange rate has appreciated since 2008.
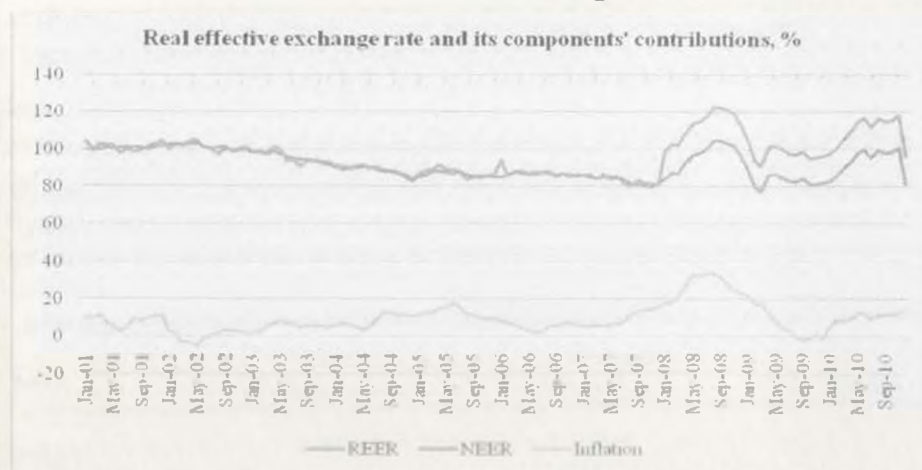
Figure 5 Real effective exchange rates and components, %

V. CONCLUDING REMARKS

Oomes and Kalcheva (2007) generated four predictions for the presence of Dutch Disease; they hypothesized that Dutch Disease would lead to 1) a decline in manufacturing growth, reflecting both direct and indirect de-industrialization; 2) faster growth in the non-tradable sector; 3) a surge in overall wage levels if labor were mobile among sectors; and 4) an appreciation in the real exchange rate due to the increased relative prices in the non-tradable sector.

In Mongolia, the service sector accounted for about 50% of the GDP according to the indices for the last 10 years, which was the period during which a classic market economy should have emerged, larger industries with outdated technologies should have disappeared, and the country should have experienced an economic revival and entered the world market. However, the opportunities available for developing the industrial sector during this period were limited due to the less costly work force in China. Thus, the service sector accounted for about 50% of the GDP. Because of the increase in the influence of the mining sector, the income earned from this sector increased the quantity of imports, thereby supporting the service sector.

On the other hand, the agricultural and farming sectors have been decreasing annually. Although the share of the GDP, the income for the state budget, and the percentage of exports attributable to the mining sector have increased, the percent of the work force in this sector has been decreasing, showing the activity of capital in this sector.

The promise made by the leading parties to give 1.5 million tugrugs to every citizen has been implemented gradually but it has had a negative influence because it supports passivity, increased inflation, and decreased rates of Mongolian tugrug. However, the influence of the election year, as mentioned above, must be considered. In this election year or in 2012, the money supply (M2) will reach its maximum level and inflation will remain at a middle level despite of government involvement; thus, the Mongolian tugrug/US dollar rate will increase only minimally under the influence of Dutch Disease.

The average monthly salary has increased annually, but has been increasing in connection with productivity in only the mining sector, and this is the feature of Dutch Disease with the greatest impact on other sectors. Thus, it is confirmed that the country of Mongolia may be characterized by

the possible symproms of Dutch Disease such as a decline in manufacturing growth, faster growth in the non-tradable sector, a surge in the overall wage level, and appreciation in the real exchange rate.

For an empirical analysis of Dutch Disease in Mongolia, we conducted a multiple regression and tested the proposition. The estimation results are mixed, where some variables support it, but others deny. On either side, it is difficult to insist strongly whether the Mongolian economy is infected by Dutch Disease. We conclude that the diagnosis of Dutch Disease cannot be confirmed even though Mongolia may be characterized by all these symptoms. Therefore, A more detailed analysis would be needed to assess the symptoms of the Dutch Disease in Mongolia.

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