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# The Extensive Margin of International Trade in a Transition Economy: The Case of Mongolia<sup>\*</sup>

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## Abstract

Using the Kehoe and Ruhl (2009) methodology, we investigate whether the variety of traded goods, which is the extensive margin of trade, has actually changed in a transition economy, such as Mongolia, as predicted by recent theoretical models. We find large increases in the extensive margin of Mongolia's trade with major trade partners such as Japan from 1997 to 2002, when Mongolia was undergoing significant structural reforms. We also find large increases in the extensive margin for the Mongolia-China and Mongolia-EU pairs after trade liberalizations due to China's accession to the World Trade Organization (WTO) (2001) and Mongolia's eligibility for the EU Generalized Systems of Preferences (GSP+) scheme (2005). We, however, find no increases in the extensive margin for the Mongolia-Russia pair during the period 2002 to 2007, when there was no major change in the trade regime of these two countries. For each episode, we evaluate whether the extensive margin growth in Mongolia, measured by the Kehoe and Ruhl methodology, was actually a consequence of the increases in the trade volumes of previously zero or little traded goods. We also show that across country pairs, mineral resources and resources coming from livestock herding contributed most to the increased extensive margin of Mongolia's exports. Our robustness checks indicate that methodologies other than that of Kehoe and Ruhl's overstate the extensive margin growth in Mongolia with small trade relationships, while they understate in developed countries with large trade relationships as documented by Kehoe and Ruhl.

**Keywords:** Mongolia, transition economies, extensive margin, structural change, trade liberalization, business cycles, small trade relationships

**JEL classifications:** F13, F14

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# 1. Introduction

Since 1990, Mongolia has been undergoing a dramatic transition from a centrally planned economy to a free market economy. During the period 1997 to 2002, Mongolia underwent significant structural reforms. To enhance and strengthen its trade relationships, Mongolia became a member of the World Trade Organization (WTO) in 1997 and applied for the Generalized Systems of Preferences (GSP) of several large economies. As a result, in 2008, Mongolia was a beneficiary of preferential schemes of Japan, the U.S., the EU, and Canada.<sup>1</sup> Thus, the composition of Mongolia's trade most likely drastically changed during this transition period.

In fact, recent theoretical models (e.g., Melitz, 2003; Yi, 2003; Arkolakis, 2010) predict that significant structural changes and trade liberalization have an effect on the extensive margin of trade.<sup>2</sup> Changes in the extensive margin of trade are changes in the variety of traded goods driven by countries starting to trade goods that they had not traded before. Changes in the intensive margin of trade, on the other hand, are changes in trade volumes of goods that were previously traded.

This raises the empirical question: Has the extensive margin of trade actually changed in response to structural reforms or trade liberalization in the transition economy of Mongolia? This paper uses the Kehoe and Ruhl (2009) methodology to answer this empirical question.

Kehoe and Ruhl (2009) have proposed a methodology for measuring changes in the extensive margin of trade. They measure the growth in the extensive margin by the growth in the least traded goods. They classify the set of goods, which accounts for only 10 percent of trade, as the least traded goods. Growth in the least traded goods indicates that a country started exporting (importing) goods that it had not exported (imported) before or had exported (imported) only in small quantities, indicating that the variety of exports (imports) increased in this country.

Applying their methodology, we find large increases in the extensive margin of Mongolia's trade with major trade partners such as Japan during the period 1997 to 2002, when Mongolia was undergoing significant structural reforms. We also find large increases in the extensive

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<sup>1</sup> Mongolia has not yet signed any regional or bilateral free-trade agreements (FTAs), but the government is considering several FTAs with its main trading partners.

<sup>2</sup> The extensive margin has recently been proven useful in understanding firm-level export patterns (Melitz, 2003; Arkolakis, 2010) and the growth in aggregate trade volumes (Yi, 2003). Kurokawa (2011) demonstrates the possible importance of the extensive margin of imports in understanding the increase in skill premium in wages.

margin for the Mongolia-China and Mongolia-EU pairs after trade liberalizations due to China's accession to the WTO (2001) and Mongolia's becoming eligible for the EU GSP+ scheme (2005), respectively.<sup>3</sup> We, however, find no increases in the extensive margin for the Mongolia-Russia pair during the period 2002 to 2007, when there was no major change in the trade regime of these two countries. The results support the Kehoe and Ruhl (2009) hypothesis that the extensive margin growth is driven by trade liberalization or structural change but not by the usual turbulence of business cycles. The results are also compatible with those of Helpman et al. (2008). Estimating a gravity equation, they show that the effect of the extensive margin of trade varies across country pairs according to the characteristics of trade partners.

Of course, there are other studies that also apply the Kehoe and Ruhl methodology to measure the extensive margin of trade, as does our paper. Mukerji (2009), for example, studies the liberalization of trade in India in the 1990s. She finds growth in the extensive margin in both Indian exports and imports. Sandrey and van Seventer (2004) also use the Kehoe and Ruhl methodology to study the liberalization of trade brought about by the Closer Economic Relationship agreement between Australia and New Zealand starting in 1988. They find evidence that the extensive margin was increasing for New Zealand exports to Australia during this period, while the export share of these goods from New Zealand to the rest of the world was relatively stable. Their results are also similar to Kehoe and Ruhl's results in that extensive margin growth coincides with trade liberalization.

There are also many studies that have determined the importance of the extensive margin using methodologies other than the methodology by Kehoe and Ruhl (2009).<sup>4</sup> Evenett and Venables (2002), for example, find that one-third of the increase in exports of developing countries between 1970 and 1997 can be explained by the extensive margin growth. Kang (2004) shows that the extensive margin played a more important role in export growth than did the intensive margin in Korea and Taiwan. Hummels and Klenow (2005) investigate cross-country differences in trade and find that the extensive margin accounts for 60 percent of the increased exports of larger economies. Studying the growing varieties of U.S. imports from 1972 to 2001,

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<sup>3</sup> The EU GSP is the system of preferential trading arrangements through which the EU extends preferential access to its markets to developing countries and economies in transition. In 2005, the EU introduced a new GSP+ scheme that envisages additional tariff privileges. The GSP+ scheme includes approximately 7,200 descriptions of goods that are admitted to the EU market without customs taxes.

<sup>4</sup> In Section 2, we will discuss the methodology by Kehoe and Ruhl (2009) and other methodologies for measuring the extensive margin.

Broda and Weinstein (2006) find that ignoring the increase in varieties leads to an overstatement of inflation by 1.2 percentage points per year, which is equivalent to an extra 2.6 percent increase in the GDP during the period. Felbermayr and Kohler (2006) find that the extensive margin was more important in the world trade growth between 1950 and 1970 and again in the mid-1990s, while the intensive margin was more important during the intervening period. Besedes and Prusa (2008) examine and compare the developed and developing countries based on their extensive and intensive export margins.

In this line of literature, our paper makes the following contributions. First, the methodology by Kehoe and Ruhl (2009) for measuring the extensive margin has been applied to developed countries or economically large developing countries with large trade relationships. Our paper now applies the methodology to the transition economy of Mongolia, which is an economically small developing country with small trade relationships. In fact, to the best of our knowledge, this paper is the first to apply the Kehoe and Ruhl methodology to Mongolia.

Secondly, our paper provides a more detailed analysis of the extensive margin growth than that of Kehoe and Ruhl's (2009). The least traded goods may incorporate some traded goods in small trade relationships, and thus, the extensive margin growth, measured by the least traded goods growth, may come from the growth of these goods. Hence, by decomposing the least traded goods into three parts - zero traded, little traded, and relatively traded goods - we check if the extensive margin growth in Mongolia, measured by the least traded goods growth, is actually a consequence of the increases in the trade volumes of previously zero or little traded goods. We also determine types of goods that contributed to the extensive margin growth. In particular, we find that mineral resources and resources coming from livestock herding contributed most to the increase in the extensive margin of Mongolia's exports across country pairs.

Thirdly, our robustness checks support Kehoe and Ruhl's (2009) prediction that country-invariant methodologies (Evenett and Venables, 2002; Hummels and Klenow, 2005; Broda and Weinstein, 2006) overestimate the extensive margin growth for countries with small trade relationships.<sup>5</sup> In fact, our results show that the extensive margin growth measured by using country-invariant methodologies is much higher than that of measured by using the Kehoe and Ruhl (2009) country-variant methodology.

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<sup>5</sup> Section 5 will compare other methodologies with the Kehoe and Ruhl (2009) methodology.

The rest of this paper is organized as follows. Section 2 presents the Kehoe and Ruhl (2009) methodology that we apply in our analysis of the extensive margin. In Section 3, we show the extensive margin growth results for the three episodes - structural change episodes, trade liberalization episodes, and business cycle episodes - in the case of Mongolia with its main trading partners. In Section 4, we discuss the possible driving forces, changes in tariffs and prices, behind the extensive margin growth. In Section 5, we present the robustness check, that is, the decomposition of the trade growth consistent with the Hummels and Klenow (2005) methodology.<sup>6</sup> Section 6 concludes.

## 2. Data and Methodology

We study detailed annual trade statistics and more specifically, Mongolian bilateral commodity trade data with its main trading partner countries. The data were obtained from the Mongolian Custom's Office and the WTO Integrated Database on Most-Favored-Nation (MFN) Applied Tariff and Imports disaggregated at the six-digit level of the harmonized system (HS).<sup>7</sup> The HS six-digit level is the most detailed level that can be compared internationally. As Hummels and Klenow (2005) argue, by using more detailed export data, we can do better job of assigning variety differences to the extensive margin.

For a given pair of countries, we study the 1996 to 2007 disaggregated data on annual trade flow values by good. We define a good as a six-digit code of the HS. We study different time periods depending on the episode to be considered. To measure the extensive margin, we use the Kehoe and Ruhl (2009) definition of a non-traded good. Kehoe and Ruhl classify the set of goods that accounts for only 10 percent of trade as the least traded goods. The set of non-traded goods is defined by the least traded goods, which include goods with very small amounts of trade as well as goods with zero trade.<sup>8</sup> The Kehoe and Ruhl definition of a non-traded goods takes

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<sup>6</sup> Hummels and Klenow (2005), using detailed trade data, decompose a nation's trade into an extensive component and an intensive component for a large cross-section of countries. They find that the extensive margin is important in explaining why big countries trade more varieties of goods than smaller countries.

<sup>7</sup> Here, an MFN tariff is a normal non-discriminatory tariff charged on imports (excluding preferential tariffs under free-trade agreements and other schemes or tariffs charged inside quotas).

<sup>8</sup> According to Kehoe and Ruhl (2009), there is no absolute concept of zero in trade statistics. For example, export shipments from the U.S. (import shipments to the U.S.) are, in general, required to be reported only if the value of the shipment is greater than 2,500 U.S. dollars (2,000 U.S. dollars). A good could have trade with a number of

into account the relative importance of a good in a country's trade, rather than imposing country-invariant dollar-value cutoffs for determining whether a good is traded or not.

According to Kehoe and Ruhl (2009), to construct the set of the least traded goods for a particular trade flow, we order the HS six-digit codes by their average value of trade over the first three years of the sample. By averaging over a few years, we eliminate the ordering's dependence on the choice of the base year. We cumulate the ordered codes to form 10 sets, each representing one-tenth of the total exports (imports). The first set is constructed, starting with the smallest codes, by adding codes to the set until the sum of their values reaches one-tenth of the total export (import) value. The next set is formed by summing the smallest remaining codes until the value of the set reaches one-tenth of the total export (import) value. The first set consists of the least traded goods: the codes with the smallest export (import) values, including all the HS codes with zero trade value.<sup>9</sup>

Given this system of partitioning the codes, we study two features of the data. First, we compute the change in the trade share of each of the 10 sets of codes during the sample period. The resulting statistics show the change in the distribution of the goods being traded. Second, we compute the evolution of the set of the least traded goods to find the timing of the growth in these goods.

Figure 1, for example, shows the values of the 10 sets of codes in 1996 for Japan's exports to Mongolia; the total value of each set of codes is equal to 0.10 of Japan's total exports to Mongolia by construction. The numbers above each bar in the figure are the number of goods needed to account for 10 percent of the trade flow. The distribution of trade is skewed, that is, it requires 1170.74 least traded goods, 526 codes (Table 1.a) of which have zero recorded export value in 1996, to account for 10 percent of the total exports from Japan to Mongolia.

The bars in Figure 1 are the fractions of trade in 2005, after 9 years, which include the period 1997 to 2002, which is the period of structural changes. To interpret these statistics, we consider the following two extreme cases. First, if the growth in trade were driven only by a proportional increase in the value of all the already traded goods, that is, if the growth in trade were entirely on the intensive margin, each set of codes would retain its one-tenth share in trade. Thus, the bars in Figure 1 would all be 0.10. Second, if the growth in trade were driven only by trade in goods

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shipments smaller than this limit and be reported as having zero trade. The minimum reporting level tends to vary across countries.

<sup>9</sup> To create sets that account for exactly 10 percent of total trade, some codes had to be split.

that were not previously traded, that is, if the growth was only on the extensive margin, the set of least traded goods would gain trade share. The trade shares of the other sets, on the other hand, would decline.

As shown in Figure 1, the movements of the trade shares of the highest 9 sets of goods are not uniform, but the data have a very large positive spike in the share of trade accounted for by the least traded goods. The 1170.7 least traded goods that account for 10 percent of Japan's exports to Mongolia in 1996 account for 28.4 percent of those same goods in 2005.

In addition, in Table 1.a, we present the decomposition of the Kehoe and Ruhl extensive margin in three parts. These include zero traded goods, little traded goods or goods with positive traded values that are less than or equal to 50,000 U.S. dollars, and relatively traded goods or goods with a trade value that is greater than 50,000 U.S. dollars. In this way, we are able to present the origins of the actual growth. As Table 1.a shows, the increases in Japan's exports of the least traded goods to Mongolia are spread across many goods. The 526 least traded goods that have zero recorded export value in 1996 have positive recorded export value in 2005, and exports of these goods account for 12.0 percent of the exports from Japan to Mongolia in that year. The share of the 618 least traded goods that were little traded in 1996 increased from 6.1 percent to 10 percent in 2005.

Using the same division of codes, our second computation focuses only on the set of the least traded goods. For each of the sample years, we compute the share of the total trade flow accounted for by the codes included in the least traded goods. Figure 3, for example, shows the evolution of the least traded goods in 1996. As in the first computation, if there was an extensive margin growth, we would observe an increase in the share of the least traded goods. An increase in the share of the least traded goods that coincides with the implementation of structural reform or trade liberalization indicates the link between the reform or liberalization and the growth in the extensive margin.

It is worth noting that the method by Kehoe and Ruhl (2009) applied in our study for measuring the extensive margin is different from methods used in the few previous studies on the extensive margin.

Hummels and Klenow (2005) and Broda and Weinstein (2006), for example, classify a good as not traded if the value of trade is zero, and Evenett and Venables (2002) classify a good as not traded if its yearly value of trade is less than or equal to 50,000 U.S. dollars (1985), regardless of



the country being studied. According to Kehoe and Ruhl's definition of a non-traded good, goods with very small, but non-zero, amounts of trade can be considered, and the actual dollar value of the cutoff can differ across countries. In fact, as mentioned in the introduction, the method by Kehoe and Ruhl has been widely used. Sandrey and van Seventer (2004), Mukerji (2009), Kurokawa (2011), and Atolia and Kurokawa (2012), for example, use their method to measure the extensive margin of trade as do we.

### **3. Extensive Margin Growth**

Following Kehoe and Ruhl (2009), in our analysis, we consider three types of episodes involving bilateral country pairs: (1) structural change episodes involve periods of rapid trade growth that are driven by significant structural transformation; (2) trade liberalization episodes involve a major change in the trade regime between country pairs; and (3) business-cycle episodes are episodes in which neither country has a significant structural transformation nor a significant change in trade policy. The business-cycle episodes allow us to observe how the extensive margin responds to the usual turbulence of business cycles.

#### **3.1. Structural change episodes**

As mentioned in the introduction, recent theoretical models predict that significant structural changes are accompanied by a significant restructuring of the composition of a country's trade, that is, the extensive margin of trade.

Since abandoning the central planning in 1991, Mongolia has made real progress toward transforming itself into a market-based economy. Hence, the private sector share of the GDP has been increasing. Raising the living standards by finding ways to overcome the constraints of isolation, distance, and limitations of the domestic market due to the population size, however, remained Mongolia's continuing development challenge. Policymakers recognized both the need for further promoting private sector development and large-scale infrastructure investments as well as restructuring Mongolia's economy to make it more competitive and to enhance its growth. Hence, policymakers took a set of important regulatory and economic measures during 1997 to 2002 that led to a new transition process. As a result, by 2005, the private sector share of the

GDP accounted for approximately 80 percent of the total economic output as compared with zero in 1991, and the foreign trade was done almost at 100 percent by private companies.

One of the measures was the opening of the country and its mineral resources to foreign trade and investment, which culminated in Mongolia's accession to the WTO and its adoption of the new minerals legislation in 1997 that was widely hailed throughout the global industry as a world-class, investor-friendly legislation. Another important legislative measure was the improvement of the foreign direct investment (FDI) law that accorded foreign investors greater security. The last amendment to the FDI law was added in 2002. Besides the overall liberalization, the government implemented social programs such as the Housing Program (1998-2005) to increase apartment supply in the capital city of Ulaanbaatar. The Housing Program had a significant impact on trade as many construction materials need to be imported due to the lack of their domestic production.

As a result of these measures, Mongolia's economy recovered by 2001, and the GDP returned to its pre-transition level of 1990. Mongolian mineral resources began to gain more attention within the country and internationally as the mining sector began to receive large FDIs. As a result, 1997 to 2005 was a period of rapid growth for Mongolian exports and imports. Exports of goods grew 6.8 fold from 155.5 million U.S. dollars in 1996 to 1,062.4 million U.S. dollars in 2005. Over this period, imports of goods grew 4.5 fold from 261.0 million U.S. dollars in 1996 to 1,173.7 million U.S. dollars in 2005.

In this section, we would like to investigate the impact of structural reforms on the extensive margin. We use the Kehoe and Ruhl's (2009) country-variant methodology and measure the extensive margin before and after the reforms. Figures 1 and 2 show the effect that these reforms had on the extensive margin in bilateral trade between Mongolia and Japan from 1996 to 2005. As we have mentioned in Section 2, the least traded 1170.7 goods of Japan's exports to Mongolia increased from 10 percent in 1996 to 28.4 percent in 2005 (Figure 1), which means that, as Mongolia liberalized and restructured, the composition of its imports from Japan changed. On the other hand, the least traded 286.2 goods of Mongolia's exports to Japan grew to 100.0 percent of over the same period (Figure 2). In addition, we report the shares of the least traded goods in total exports for the base (1996) and end of the period (2005) and their decomposition in Table 1.a. For example, the second line of Mongolia's exports to Japan in Table 1.a indicates that Mongolian zero traded goods of 107 grew from 0 percent in 1996 to 97.3 percent in 2005

and made the most contribution to the growth of the share of the least traded goods, whereas the share of little traded and relatively traded goods among the least traded goods fell during that period.

Figure 3 provides details regarding the timing of the extensive margin growth. It appears that structural reforms first affected Japan's exports to Mongolia. In fact, Japanese companies and companies with Japanese shareholders in Mongolia imported mining and construction equipment such as heavy transporters and other transportation vehicles. The share of the least traded goods of Japan's exports to Mongolia increased dramatically during 1999 to 2000, while the set of least traded goods of Mongolia's exports to Japan rose from 2002 to 2004 as the mining sector started exporting. As Figure 3 shows, the share of the least traded goods of both exports significantly increased during the years of the structural reforms, ultimately reaching a higher level than before and maintaining at that level for the subsequent years. It appears that structural changes had a large effect on the extensive margin for both the exports of both countries.

This result is not unique only between Mongolia and Japan. The same growth patterns emerged for the bilateral trade between Mongolia and its other 9 main trading partners as evidenced in the results reported in Tables 1.a and 1.b. It should be noted that as the trade environment changed between Mongolia and China due to the China's accession to the WTO by the end of 2001, the extensive margin calculations between these two countries in this structural change episode were made only for the period from 1996 to 2001, thus isolating the effect of China's tariff reductions.

What were the specific growth areas? Tables 2 and 3 show the classifications of the big gainers among the least traded goods at HS 2-digit level for Mongolia's imports and exports with its 10 main trading partners. In the case of the least traded goods in Mongolia's imports from main trading partners, the big gainers were oil, due to the large increase in the number of automobiles and mining vehicles, equipment, machinery, materials, and other consumer goods (Table 2). The least traded 15 categories of Mongolia's imports from main trading partners increased their share in total imports from 4.2 percent in 1996 to 36.6 percent in 2005. In the case of the least traded goods in Mongolia's exports to main trading partners, the big gainers were mineral resources, resources coming from livestock herding, and cashmere and wool textiles (Table 3). The least traded 10 categories of Mongolian exports to its main trading partners increased their share of 3.9 percent in 1996 to 50.8 percent in 2005.

In this section 3.1, we have described an increase in the shares of the set of the least traded goods in Mongolian trade with all of its main trading partners during the period of structural change, thus indicating the importance of these structural changes. In fact, almost all of the main trading partners produced goods related to the Mongolian policy changes from 1997 to 2002. It should be noted, however, that these episodes are not clean policy experiments because several reforms and programs were implemented at the same time. Hence, it would be difficult to disentangle the effect of each policy change on the composition of trade.

### **3.2. Trade liberalization episodes**

It is difficult to specifically identify the partial impact of trade liberalization cases, such as Mongolia's accession to the WTO (1997) and Mongolia's becoming eligible for the GSP schemes of the U.S. (1999) and Japan (2000), from the impact of the structural changes during the period 1997 to 2002. Thus, in our analysis of trade liberalization, we consider two other episodes where there were changes in the Mongolian trade environment.

First, we consider a trade liberalization episode due to the accession of China to the WTO (2001). Next, we show the extensive margin changes in Mongolian exports to the EU as a result of becoming eligible for the EU GSP+ scheme (2005). A plausible hypothesis for these trade liberalization cases, according to prior research, would be that changes in the trade regime change the decomposition of trade.

China became a member of the WTO by the end of 2001. China's share in the Mongolian total trade was 40.5 percent in 2001. To meet the fundamental principles of the General Agreement on Tariffs and Trade (GATT) and the WTO, China committed to removing most tariff barriers by 2004, with some minor exceptions; however, all barriers were to be lifted no later than 2010. By 2004, China's average bound tariff level was to decrease to 15 percent for agricultural products, ranging from 0 to 65 percent, with the higher rates applied to cereals. For industrial goods, the average bound tariff level was to decrease to 8.9 percent, with a range from 0 to 47 percent, with the highest rates applied to photographic film, automobiles and related products.

For measuring the extensive margin in trade between Mongolia and China, we use the time period from 2001 to 2007.<sup>10</sup> As can be seen in Figures 4 and 5, there is a significant extensive margin growth between Mongolia and China when we compare results for 2001 and 2007. The least traded 2,761.4 Chinese goods to Mongolia went from 10 percent of the total exports to Mongolia in 2001 to 78.0 percent in 2007. The least traded 479.7 Mongolian goods to China increased their shares from 10.0 percent to 40.0 percent of the total exports to China during the same time period. Figure 6 shows the dynamics of these changes. As can be seen, the increases were drastic just after China's accession to the WTO in 2001.

Table 4 summarizes the results of the trade liberalization episode between Mongolia and China. It should be noted that the Kehoe and Ruhl (2009) methodology measures the extensive margin as a set of the least traded goods and, thus, may allow some traded goods in the case of small trade relationships to account for the extensive margin growth. Therefore, we examine the decomposition of the Kehoe and Ruhl's extensive margin. Reported in Table 4 is the decomposition of the base and the end-of-period shares of the least traded goods in total exports and the number of goods that account for the shares. Upon analysis of this decomposition, we find that the extensive margin growth in trade between Mongolia and China following China's import tariff reductions comes from zero or little traded goods among the least traded goods.<sup>11</sup>

What were the specific growth areas? The data are examined to determine what accounted for the significant growth. A general insight into those categories responsible for the growth of the extensive margin is given in Tables 5 and 6. The tables show the classifications of the big gainers among the least traded goods at HS 2-digit level for China's and Mongolia's exports where we observe an enormous increase in the traded value from 2001 to 2007. In the case of the least traded goods in China's exports to Mongolia, the big gainers were products of the printing industry, fuels, construction materials, and mining vehicles (Table 5). China's least traded 10 Chinese goods categories increased their share in total exports from 4.1 percent in 2001 to 60 percent in 2007. In the case of the least traded goods in Mongolia's exports to China, the big gainers were mineral resources and resources coming from livestock herding (Table 6).

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<sup>10</sup> The year 2007 is chosen as an end-of-period to control the macroeconomic effects that may come from the global Lehman Brother's shock.

<sup>11</sup> Only in the case of Mongolian exports of the least traded goods, we observe some traded goods (relatively traded goods) incorporated in the extensive margin. But the share of these traded goods declines, as shown in Table 4.

Mongolian's least traded 8 goods categories increased their share in total exports from 5.7 percent in 2001 to 36 percent in 2007.

Another trade liberalization case that we consider is the change in the Mongolian trade environment due to becoming eligible for the EU GSP+ (2005). The EU's share in the Mongolian total trade was 11.3 percent in 2005. We measure the Kehoe and Ruhl (2009) extensive margin by comparing 2002 and 2007, which are before and after the change in the trade regime only for Mongolian exports as it is a one-sided liberalization. Mongolia became eligible for the EU GSP+ by the end of 2005.<sup>12</sup> Because the status is granted for the next three years only (2006 to 2008), we compare the trade statistics of 2002 and 2007. We do not consider 2008, thus eliminating the impact of the global financial crisis on the trade.

The results for the Mongolia-EU trade liberalization episode are summarized in Figures 7 and 8 and Table 4. Figure 7 shows that the least traded 519 Mongolian goods to the EU went from 10 percent of the total exports to the EU in 2002 to 33.8 percent in 2007. Figure 8 shows the timing of the increase in the extensive margin in Mongolian exports to the EU coincides with the change in the trade regime. Table 4 reports that the growth on the extensive margin comes from the growth in the share of zero or little traded goods among the least traded goods.

What were the specific growth areas? Table 7 shows the classifications of the big gainers among the least traded goods at HS 2-digit level for Mongolia's exports to the EU where we observed an enormous increase in the traded value from 2002 to 2007. The big gainers were mineral resources, cashmere and wool textiles, and resources coming from livestock herding. Mongolian's least traded 3 categories increased their share in total exports from 1.5 percent in 2002 to 23 percent in 2007.

### **3.3. Business-cycle episodes**

We have, thus far, studied the country pairs in which there were significant structural changes or trade regime changes. We can also study country pairs in which there were no significant structural changes or trade regime changes so as to study the effects of normal business-cycle fluctuations on the extensive margin. We argue that unlike significant structural changes or trade liberalization, normal business-cycle fluctuations do not cause significant fluctuations in the

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<sup>12</sup> Practically all Mongolian export products are granted tariff-free access to the EU as a result of the GSP+.

extensive margin. To see how the extensive margin changes during the business cycles, we compute the same measures of extensive margin growth for Russian exports to Mongolia during the period 2002 to 2007. During this period, there was no major change in the trade regimes of these two countries.

Figures 9 and 10 demonstrate how little the trade patterns have changed between these two countries. As can be seen, there is no major change in the mix of goods in Russian exports to Mongolia during the period 2002 to 2007, and there is no large variation in the share of exports accounted for by the least traded goods over this period. In Table 8, we show the decomposition of the changes in the share of the least traded goods.

As mentioned in Kehoe and Ruhl (2009), the lack of change in the extensive margin during the business cycles indicates that exporting decisions would not be trivial matters for firms. This is because firms usually face large sunk costs to establish an export operation as in Melitz (2003). Temporal changes, such as business cycles, may not induce firms to make (or abandon) large sunk investments. Large permanent changes, however, may induce firms to enter (or exit) the export markets. Ruhl (2008), for example, constructs a quantitative general equilibrium model of fixed costs under uncertainty and finds that much of the difference in the response of exports to business cycles versus trade liberalization can be accounted for by these factors.

## **4. Driving Forces**

As in Kehoe and Ruhl (2009), by looking at the data, we attempt to answer the following two questions about the driving forces behind our results. The first question is whether the increases in the extensive margin of trade were driven by decreases in tariffs that were larger for the least traded goods than for the other goods. The second question is whether the increases in the extensive margin were driven by decreases in the relative prices of the least traded goods as compared to the other goods.

### **4.1. Tariffs**

To answer the first question, using the WTO Integrated Database on MFN Applied Tariff and Imports, we compute changes in applied tariffs for Mongolia and its main trading partners for the

structural change and trade liberalization episodes. Applied tariff rates on the WTO database are reported at an HS six-digit level. We study applied tariff changes for periods that showed large increases on the extensive margin to infer whether the growth was driven by these changes. For each HS six-digit code, we average the available tariff rates over the base and end-of-periods.

The results for the structural change episodes are reported in Table 9. Tariff calculations for Germany will represent tariff changes in Italy and the UK as the applied tariff rates are the same. We do not compute changes in tariffs for Russia because there were no significant tariff reductions as the country was not a member of the WTO. Table 9 presents significant tariff reductions in China, Korea, the U.S. and Mongolia in 2000 for the least traded goods relative to the other goods. We, however, find no changes in tariffs for Hong Kong and Singapore for the time period. For Japan and Germany, we find reductions in tariffs for the least traded goods, but they were less than those of traded goods.

As for the trade liberalization episodes, we calculate changes in the tariff rates for the Mongolia-China and Mongolia-EU trade flows. The results are represented in Table 10. We find significant tariff reductions for the least traded goods in China and the EU. In the case of the EU, however, tariff reductions for the least traded goods were less than those for the other goods.

In addition, we find in both episodes that the tariff changes for the least traded goods were more dispersed than those for the other goods, but there is no clear-cut evidence that the tariffs on the least traded goods decreased systematically more than those on the other goods.

## 4.2. Relative prices

In answering the second question of whether the extensive margin growth was driven by decreases in the relative prices of the least traded goods as compared to the other goods, we face some data limitations. There are no data on the quantity for many goods, and the unit value data that we use to calculate relative prices are very noisy. Nonetheless, we try to analyze the data for the structural change and trade liberalization episodes.

As in Kehoe and Ruhl (2009), we calculate the price of code  $k$  in year  $t$  relative to base year  $t_0$  as<sup>13</sup>:

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<sup>13</sup> Here, prices are calculated for every code for which prices and quantities were positive in both years, and the units that quantities were measured in did not change.



$$\frac{p_k^t}{p_k^{t_0}} = \frac{v_k^t / q_k^t}{v_k^{t_0} / q_k^{t_0}} \quad (1)$$

where  $v_k^t$  is the value of exports of code  $k$  in year  $t$  and  $q_k^t$  is the quantity of exports of code  $k$  in year  $t$ .

Tables 11 and 12 report the prices of the least traded exports relative to the prices of the other exported goods. The relative prices are adjusted by the annual average currency exchange rates against the U.S. dollar. These tables show the movements in the average price of the least traded goods relative to the average price of the other goods for exports from the main trading partners to Mongolia and from Mongolia to the main trading partners during the periods of the large extensive margin growth. For example, the first line in Table 11 shows the movements in the average price (in JPY) of the least traded goods relative to the average price of the other goods for exports from Japan to Mongolia during the period 1998 to 2000. Note that we drop some years from the sample because in these years most of the unit value data are missing.

As shown in Table 11, the data indicate that much of the increase in the exports of the least traded goods from the main trading partners to Mongolia in the structural change episodes was not accompanied by the systematic decreases in the relative prices of these goods.

We find the same results for the least traded goods of Mongolian exports to the U.S., Japan, Korea, and Germany. In fact, the exports of the least traded goods to these partner countries have increased despite the rise in prices of these goods relative to the other goods. On the other hand, we find that the relative prices of the least traded goods of Mongolian exports to Russia, China, and Hong Kong decreased while their share in exports increased.

In the case of the trade liberalization episodes, we also find different results among countries that are represented in Table 12. The table shows that during the large growth in the extensive margin, the relative prices of the least traded goods of Mongolian exports to China and Chinese exports to Mongolia decreased while the relative prices of the least traded Mongolian goods to the EU increased.

In both episodes, we cannot find clear-cut evidence for a systematic decrease in the relative prices of the least traded goods during the periods of the large growth in the extensive margin.

## 5. Robustness Check: Decomposing Trade Growth

Using the Hummels and Klenow (2005) decomposition of trade margins, we check how the country-variant Kehoe and Ruhl (2009) characterization of the extensive margin differs from the country-invariant characterizations in the case of countries with small trade relationships such as Mongolia.<sup>14</sup>

Hummels and Klenow (2005) decompose the change in country  $i$ 's share of total imports to country  $j$  into that accounted for by the extensive and intensive margins.<sup>15</sup> To compute this decomposition, we define a non-traded good. Thus far, we have used the Kehoe and Ruhl (2009) country-variant cutoff, that is, the least traded goods. We also use country-invariant cutoffs as in Evenett and Venables (2002), Hummels and Klenow (2005), and Broda and Weinstein (2006). We then compare the results of the decomposition under different definitions of a non-traded good.

We compute the decomposition of trade margins for the structural change and trade liberalization episodes and report them in Table 13. To compute the decomposition, we need data on the country's total imports by its six-digit HS code. The first column of the table shows the growth rates of the extensive margin measured by Kehoe and Ruhl (2009) for reference. Columns 2 and 3 report the decomposition when a good is non-traded according to a country-invariant cutoff value. Column 2 uses a zero cutoff value, as in Hummels and Klenow (2005) and Broda and Weinstein (2006), and column 3 uses a cutoff value of 50,000 U.S. dollars, as in Evenett and Venables (2002). The fourth column reports the decomposition using the country-variant 10 percent cutoff values implied by the Kehoe and Ruhl's definition of least traded goods.<sup>16</sup>

As can be seen in Table 13, the decompositions that employ different cutoffs show different results for the extensive margin growth. In contrast to Kehoe and Ruhl's findings for large trade relationships, the decomposition that uses the cutoff of strict 0 U.S. dollars presents the highest extensive margin growth while the Kehoe and Ruhl's 10 percent cutoff presents the smallest extensive margin growth among the three cutoffs. This finding reflects that countries with small

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<sup>14</sup> Hillberry and McDaniel (2002) also use the Hummels and Klenow (2005) decomposition to examine the growth in U.S. trade with its North American Free Trade Agreement (NAFTA) partners, finding growth in both the extensive and intensive margins.

<sup>15</sup> See Kehoe and Ruhl (2009) for the detailed procedure used to compute the Hummels and Klenow (2005) decomposition.

<sup>16</sup> Here, we take as the 10 percent cutoff value the average (over the first three years of the sample) amount of trade in the first good, which is not included in the set of the least traded goods. Of course, this 10 percent cutoff value varies across countries.

trade relationships, such as Mongolia, trade less than 50,000 U.S. dollars in many of the goods, that is, there are many non-traded goods. Kehoe and Ruhl, on the other hand, find that countries with large trade relationships trade more than 50,000 U.S. dollars in almost every good, that is, there are no non-traded goods.

As can be seen in Table 13, in the case of Mongolia's small trade relationships, country-invariant cutoffs provide the significant extensive margin growth in almost all of Mongolian exports to and imports from the main trading partners following the changes in the policy, with the exception of Hong Kong's exports to Mongolia and Mongolia's exports to the U.S. The negative sign of the extensive margin in the case of Hong Kong's exports to Mongolia means that the weight of Hong Kong's goods newly exported to Mongolia declines in overall Mongolian imports. The negative sign for Mongolia's exports to the U.S. indicates that Mongolia's goods newly exported to the U.S. have lost their weight in overall imports of the U.S. from 1996 to 2005. Hence, Mongolian policymakers should understand the driving forces of the decline in the U.S. demand for these goods. Furthermore, it appears that the U.S. demand for these goods will decline further due to the technological changes. In addition, Table 13 shows that the least traded goods of Mongolia's exports to Hong Kong and to Japan and the least traded goods of Russia's exports to Mongolia experienced the greatest growth.

There is an obvious contrast between Kehoe and Ruhl's (2009) findings for large trade relationships and our findings for small trade relationships. This supports Kehoe and Ruhl's argument that a country-invariant cutoff may understate the extensive margin in large trade relationships and overstate the extensive margin in small trade relationships.

According to Kehoe and Ruhl (2009), one possible resolution of this underestimation of the extensive margin in large trade relationships is to increase the cutoff value. However, if this increased cutoff value is country-invariant, this causes problems in small trade relationships. For example, Kehoe and Ruhl (2009) show that the country-variant 10 percent cutoff implies that any good exported from Canada to the U.S. at less than 76,122,400 U.S. dollars is non-traded, and a good exported in the amount of 76,122,400 U.S. dollars accounts for only 0.093 percent of the total trade flow. The country-invariant cutoffs, however, consider this good heavily traded. To classify these heavily traded goods as non-traded under a country-invariant cutoff, we need to increase the cutoff value. If this increased cutoff value is constant across country pairs, this creates problems measuring non-traded goods in small trade relationships. In the case of

Mongolia, for example, the cutoff value of 76,122,400 U.S. dollars implies that a good valued at 64.0 percent of total Mongolian exports to the EU would be considered a non-traded good.

## **6. Conclusion**

Using the Kehoe and Ruhl (2009) methodology, we examined Mongolia's trade data from several structural change and trade liberalization episodes in which theoretical models predict changes in the extensive margin of trade. We found large increases in the extensive margin in Mongolia's trade with major trade partners such as Japan during the period 1997 to 2002, when Mongolia was undergoing significant structural reforms. We also found significant increases in the extensive margin for the Mongolia-China and Mongolia-EU pairs after trade liberalizations due to China's accession to the WTO (2001) and Mongolia's eligibility for the EU GSP+ scheme (2005), respectively. However, we found no increases in the extensive margin for the Mongolia-Russia pair during the period from 2002 to 2007, when there was no major change in the trade regime of these two countries. Thus, our findings support the hypothesis that the extensive margin growth is driven by trade liberalization or structural change but not by the usual turbulence of business cycles.

The new Kehoe and Ruhl's (2009) measure of the extensive margin may incorporate some traded goods in small trade relationships, and the growth of the extensive margin may come from the growth of these goods. Hence, we decomposed the least traded goods into three parts: zero traded, little traded, and relatively traded goods. Then, we indicated that the least traded goods growth comes from the growth of zero and little traded goods rather than from the growth of relatively traded goods. Hence, the Kehoe and Ruhl definition of non-tradedness is also consistent for the case of Mongolia.

To check the robustness of our results, we calculated Hummel and Klenow's (2005) decomposition of the import share using different cutoff values. Our results support Kehoe and Ruhl's (2009) claim that country-invariant cutoffs overestimate the extensive margin growth for countries with small trade relationships. In fact, the extensive margin growth measured by using country-invariant cutoffs is much higher than that measured by using the Kehoe and Ruhl country-variant 10 percent cutoff.

Based on our analysis, we conclude that policy measures taken by the government from 1997 to 2002 (the period of structural reforms) and the trade liberalizations have had an overall important effect on the extensive margin of trade. In particular, we find that mineral resources and resources coming from livestock herding contributed most to the increase in the extensive margin of Mongolia's exports across country pairs. Thus Mongolian government should keep the overall favorable environment for FDI to allow international market access of country's resources. On the other hand, Mongolian government should develop industries that process those resources and join with them the regional production network.

Finally, let us introduce briefly what we would like to do in the near future. As next, we would like to investigate whether the increase in the extensive margin of trade has an impact on changes in welfare in Mongolia. Arkolakis et al. (forthcoming) show that Melitz-type models do not necessarily entail large gains from trade. Thus it would be interesting to test quantitatively whether this finding is true in the case in Mongolia.

We also would like to monitor carefully Mongolia's trade. This is important because many countries have recently begun to consider Mongolia as a new source of important materials, such as rare earth and other minerals. As a result, the extensive margin of Mongolia's trade may drastically change in the following years. In addition, it is worth to note that WTO Ministers adopted Russia's WTO terms of entry at the 8<sup>th</sup> Ministerial Conference in Geneva, and now Russia is to ratify the deal and will become a WTO member. According to the Russia's commitments, Russia has agreed to lower its tariffs on trade and reduce its non-tariff barriers on a wide range of products. Hence, Mongolia and Russia may start to trade new goods and growth in the extensive margin may contribute to the growth in trade between the two countries and overall growth in trade.

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Table 1.a Share of least traded goods for the top 1-5 trading partners: Structural change episodes

Period	Trade flow	Share of total exports in base year	Share of total exports in end of period year	Number of Goods
1996:2005	<b>Mongolia to Russia</b>	<b>0.1000</b>	<b>0.9683</b>	<b>278.7</b>
	<i>Zero traded goods</i>	-	0.9491	154.0
	<i>Little traded goods</i>	0.1000	0.0192	124.7
1996:2005	<b>Russia to Mongolia</b>	<b>0.1000</b>	<b>0.9949</b>	<b>986.0</b>
	<i>Zero traded goods</i>	-	0.9926	473.0
	<i>Little traded goods</i>	0.1000	0.0023	513.0
1996:2001	<b>Mongolia to China</b>	<b>0.1000</b>	<b>0.8822</b>	<b>251.1</b>
	<i>Zero traded goods</i>	-	0.8615	124.0
	<i>Little traded goods</i>	0.0220	0.0064	109.0
	<i>Relatively traded goods</i>	0.0780	0.0143	18.1
1996:2001	<b>China to Mongolia</b>	<b>0.1000</b>	<b>0.6597</b>	<b>1,420.9</b>
	<i>Zero traded goods</i>	-	0.4934	561.0
	<i>Little traded goods</i>	0.1000	0.1662	859.9
1996:2005	<b>Mongolia to Japan</b>	<b>0.1000</b>	<b>1.0000</b>	<b>286.2</b>
	<i>Zero traded goods</i>	-	0.9734	107.0
	<i>Little traded goods</i>	0.0477	0.0109	171.0
	<i>Relatively traded goods</i>	0.0524	0.0157	8.16
1996:2005	<b>Japan to Mongolia</b>	<b>0.1000</b>	<b>0.2837</b>	<b>1,170.7</b>
	<i>Zero traded goods</i>	-	0.1203	526.0
	<i>Little traded goods</i>	0.0613	0.1001	618.0
	<i>Relatively traded goods</i>	0.0387	0.0633	26.74
1996:2005	<b>Mongolia to Korea</b>	<b>0.1000</b>	<b>1.0000</b>	<b>144.87</b>
	<i>Zero traded goods</i>	-	0.9986	109.0
	<i>Little traded goods</i>	0.0607	0.0014	30.0
	<i>Relatively traded goods</i>	0.0393	-	5.87
1996:2005	<b>Korea to Mongolia</b>	<b>0.1000</b>	<b>0.6375</b>	<b>1,395.9</b>
	<i>Zero traded goods</i>	-	0.4319	705.0
	<i>Little traded goods</i>	0.1000	0.2018	690.9
1996:2005	<b>Mongolia to US</b>	<b>0.1000</b>	<b>0.8382</b>	<b>188.6</b>
	<i>Zero traded goods</i>	-	0.6454	153.0
	<i>Little traded goods</i>	0.1000	0.1928	35.6
1996:2005	<b>US to Mongolia</b>	<b>0.1000</b>	<b>0.6416</b>	<b>1,045.5</b>
	<i>Zero traded goods</i>	-	0.2634	649.0
	<i>Little traded goods</i>	0.1000	0.3782	396.5

Source: Mongolian Custom's Office: Annual trade statistics



Table 1.b Share of least traded goods for the top 6-10 trading partners: Structural change episodes

Period	Trade flow	Share of total exports in base year	Share of total exports in end of period year	Number of Goods
1996:2005	<b>Mongolia to Germany</b>	<b>0.1000</b>	<b>0.9344</b>	<b>174.8</b>
	<i>Zero traded goods</i>	-	0.8602	147.0
	<i>Little traded goods</i>	0.1000	0.0742	27.8
1996:2005	<b>Germany to Mongolia</b>	<b>0.1000</b>	<b>0.7999</b>	<b>1,481.7</b>
	<i>Zero traded goods</i>	-	0.5753	788.0
	<i>Little traded goods</i>	0.1000	0.2246	693.7
1996:2005	<b>Mongolia to UK</b>	<b>0.1000</b>	<b>1.0000</b>	<b>62.96</b>
	<i>Zero traded goods</i>	-	1.0000	58.0
	<i>Little traded goods</i>	0.1000	0.0000	5.0
1996:2005	<b>UK to Mongolia</b>	<b>0.1000</b>	<b>0.9540</b>	<b>312.01</b>
	<i>Zero traded goods</i>	-	0.7202	230.0
	<i>Little traded goods</i>	0.1000	0.2338	82.0
1996:2005	<b>Mongolia to Italy</b>	<b>0.1000</b>	<b>1.0000</b>	<b>37.0</b>
	<i>Zero traded goods</i>	-	0.9973	22.0
	<i>Little traded goods</i>	0.0153	0.0027	15.0
	<i>Relatively traded goods</i>	0.0846	-	2.03
1996:2005	<b>Italy to Mongolia</b>	<b>0.1000</b>	<b>0.5311</b>	<b>375.0</b>
	<i>Zero traded goods</i>	-	0.6998	210.0
	<i>Little traded goods</i>	0.1000	0.2366	165.0
1996:2005	<b>Mongolia to Singapore</b>	<b>0.1000</b>	<b>0.4021</b>	<b>55.1</b>
	<i>Zero traded goods</i>	-	0.4021	53.0
	<i>Little traded goods</i>	0.1000	-	2.1
1996:2005	<b>Singapore to Mongolia</b>	<b>0.1000</b>	<b>0.4654</b>	<b>713.8</b>
	<i>Zero traded goods</i>	-	0.3443	352.0
	<i>Little traded goods</i>	0.1000	0.1212	361.8
1996:2005	<b>Mongolia to Hong Kong</b>	<b>0.1000</b>	<b>0.9993</b>	<b>70.1</b>
	<i>Zero traded goods</i>	-	0.4533	39.0
	<i>Little traded goods</i>	0.1000	0.5461	31.1
1996:2005	<b>Hong Kong to Mongolia</b>	<b>0.1000</b>	<b>0.5827</b>	<b>562.1</b>
	<i>Zero traded goods</i>	-	0.5105	398.0
	<i>Little traded goods</i>	0.1000	0.0722	164.1

Source: Mongolian Custom's Office: Annual trade statistics

**Table 2 Big gainer-least traded goods of main trading partners' exports to Mongolia (In millions of U.S. dollars): Structural change episodes**

HS 2 digit	Definition	1996	2005	Difference
27	Mineral fuels, mineral oils & products of their distillation; bitumen substances;	-	271.77	271.77
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	6.87	38.18	31.31
11	Milling products; malt; starch; inulin; wheat gluten	-	19.81	19.81
85	Electric machinery, equipment and parts; sound equipment; television equipment	3.03	17.42	14.39
40	Rubber and articles thereof.	-	11.83	11.83
51	Wool & animal hair, including yarn & woven fabric	0.11	9.36	9.25
22	Beverages, spirits and vinegar	-	8.53	8.53
10	Cereals	-	7.19	7.19
33	Essential oils and resinoids; perfumery, cosmetic or toilet preparations	-	6.92	6.92
17	Sugars and sugar confectionary	-	6.82	6.82
21	Miscellaneous edible preparations	-	6.61	6.61
87	Vehicles, (not railway, tramway, rolling stock); parts and accessories	0.98	7.58	6.59
30	Pharmaceutical products	-	6.57	6.57
39	Plastics and articles thereof.	-	5.46	5.46
15	Animal Or Vegetable Fats	-	5.07	5.07
	<b>SUM</b>	<b>11.00</b>	<b>429.13</b>	<b>418.14</b>
	<b>Total exports</b>	<b>261.03</b>	<b>1,173.72</b>	<b>912.69</b>
	<b>Share in total exports</b>	<b>0.042</b>	<b>0.366</b>	<b>0.323</b>

Source: Mongolian Custom's Office: Annual trade statistics

**Table 3 Big gainer-least traded goods of Mongolia's exports to main trading partners (In millions of U.S. dollars): Structural change episodes**

HS 2 digit	Definition	1996	2005	Difference
71	Pearls, Precious Or Semi-Precious Stones, Metals	-	195.39	195.39
26	Ores, slag and ash	-	149.27	149.27
41	Raw hides and skins (other than fur skins) and leather	0.15	45.59	45.44
61	Apparel articles and accessories, knitted or crocheted	0.78	39.03	38.24
62	Apparel articles and accessories, not knitted or crocheted	1.71	35.48	33.77
51	Wool & animal hair, including yarn & woven fabric	2.74	33.63	30.89
25	Salt; sulfur; earth & stone; lime & cement plaster	-	18.99	18.99
02	Meat and edible meat offal	-	8.19	8.19
74	Copper and articles thereof	0.65	8.58	7.93
27	Mineral fuels, mineral oils & products of their distillation; bitumen substances; mineral wax	-	5.49	5.49
	<b>SUM</b>	<b>6.03</b>	<b>539.65</b>	<b>533.62</b>
	<b>Total exports</b>	<b>155.48</b>	<b>1,062.35</b>	<b>906.87</b>
	<b>Share in total exports</b>	<b>0.039</b>	<b>0.508</b>	<b>0.469</b>

Source: Mongolian Custom's Office: Annual trade statistics

**Table 4 Share of least traded goods: Trade liberalization episodes**

Period	Trade flow	Share of total exports in base year	Share of total exports in end of period year	Number of Goods
2001:2007	<b>Mongolia to China</b>	<b>0.1000</b>	<b>0.4000</b>	<b>479.7</b>
	<i>Zero traded goods</i>	-	0.2459	321.0
	<i>Little traded goods</i>	0.0044	0.1019	110.0
	<i>Relatively traded goods</i>	0.0957	0.0522	48.7
2001:2007	<b>China to Mongolia</b>	<b>0.1000</b>	<b>0.7800</b>	<b>2,761.4</b>
	<i>Zero traded goods</i>	-	0.3141	1,606.0
	<i>Little traded goods</i>	0.1000	0.4659	1,155.4
2002:2007	<b>Mongolia to EU</b>	<b>0.1000</b>	<b>0.3381</b>	<b>519.0</b>
	<i>Zero traded goods</i>	-	0.2017	206.0
	<i>Little traded goods</i>	0.0337	0.0737	299.0
	<i>Relatively traded goods</i>	0.0663	0.0627	14.0

Source: Mongolian Custom's Office: Annual trade statistics

**Table 5 Big gainer-least traded goods of China's exports to Mongolia (In millions of U.S. dollars): Trade liberalization episodes**

HS 2 digit	Definition	2001	2007	Difference
49	Printed books, newspapers, pictures and other products of printing industry; manuscripts	0.05	106.61	106.56
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	0.62	68.79	68.17
85	Electric machinery, equipment and parts; sound equipment; television equipment	0.44	67.31	66.87
73	Articles of iron or steel	0.21	44.49	44.27
72	Iron and steel	0.16	27.28	27.12
87	Vehicles, (not railway, tramway, rolling stock); parts and accessories	0.14	24.69	24.55
27	Mineral fuels, mineral oils & products of their distillation; bitumen substances; mineral wax	0.01	20.52	20.51
39	Plastics and articles thereof.	0.23	17.73	17.50
68	Articles of stone, plaster, cement, asbestos, mica or similar materials	0.17	10.75	10.58
94	Furniture; bedding, mattresses, cushions etc; other lamps & light fitting, illuminated signs and nameplates, prefabricated buildings	0.20	10.60	10.39
	<b>SUM</b>	<b>2.24</b>	<b>398.77</b>	<b>396.54</b>
	<b>Total exports</b>	<b>54.78</b>	<b>664.66</b>	<b>609.87</b>
	<b>Share in total exports</b>	<b>0.041</b>	<b>0.600</b>	<b>0.559</b>

Source: Mongolian Custom's Office: Annual trade statistics

**Table 6 Big gainer-least traded goods of Mongolia's exports to China (In millions of U.S. dollars): Trade liberalization episodes**

HS 2 digit	Definition	2001	2007	Difference
26	Ores, slag and ash	0.06	195.47	195.41
51	Wool & animal hair, including yarn & woven fabric	2.95	123.83	120.88
27	Mineral fuels, mineral oils & products of their distillation; bitumen substances; mineral wax	0.00	115.48	115.48
41	Raw hides and skins (other than fur skins) and leather	9.60	36.85	27.25
74	Copper and articles thereof	0.65	19.56	18.90
87	Vehicles, (not railway, tramway, rolling stock); parts and accessories	-	7.45	7.45
85	Electric machinery, equipment and parts; sound equipment; television equipment	0.00	4.74	4.73
25	Salt; sulfur; earth & stone; lime & cement plaster	0.00	3.49	3.48
	<b>SUM</b>	<b>13.27</b>	<b>506.86</b>	<b>493.59</b>
	<b>Total exports</b>	<b>230.89</b>	<b>1,406.89</b>	<b>1,176.01</b>
	<b>Share in total exports</b>	<b>0.057</b>	<b>0.360</b>	<b>0.303</b>

Source: Mongolian Custom's Office: Annual trade statistics

**Table 7 Big gainer-least traded goods of Mongolia's exports to the EU: Trade liberalization episodes**

HS 2 digit	Definition	2002	2007	Difference
26	Ores, slag and ash	0.00	13.98	13.98
61	Apparel articles and accessories, knitted or crocheted	0.11	8.29	8.18
41	Raw hides and skins (other than fur skins) and leather	0.24	5.02	4.77
	<b>SUM</b>	<b>0.35</b>	<b>27.28</b>	<b>26.93</b>
	<b>Total exports</b>	<b>23.04</b>	<b>118.83</b>	<b>95.79</b>
	<b>Share in total exports</b>	<b>0.015</b>	<b>0.230</b>	<b>0.214</b>

Source: Mongolian Custom's Office: Annual trade statistics

**Table 8 Share of least traded goods: Business cycle episode**

Period	Trade flow	Share of total exports in base year	Share of total exports in end of period year	Number of Goods
2002:2007	<b>Russia to Mongolia</b>	<b>0.1000</b>	<b>0.0920</b>	<b>1,562.0</b>
	<i>Zero traded goods</i>	-	0.0104	218.0
	<i>Little traded goods</i>	0.0446	0.0389	1,344.0
	<i>Relatively traded goods</i>	0.0554	0.0427	170.00

Source: Mongolian Custom's Office: Annual trade statistics

**Table 9 Applied MFN tariff changes: Structural change episodes**

Country	The base period	The end-of-period	Type of goods	Decrease	No change	Increase	Average tariff in base period	Average tariff at end of period	Tariff level change
Import tariffs of Japan	2000-2001	2002-2003	Ltg****	193	639	18	3.17	3.12	(0.05)
			Tg*****	1	2	1	3.63	0.50	(3.13)
Import tariffs of US	1997-1998	1999-2000	Ltg	394	177	4	5.33	4.85	(0.49)
			Tg	11	2	-	9.77	9.50	(0.27)
Import tariffs of Hong Kong	1996-1998	2001-2003	Ltg	-	194	-	-	-	-
			Tg	-	19	-	-	-	-
Import tariffs of Korea	1997-1998	1999-2000	Ltg	98	439	100	8.35	8.30	(0.08)
			Tg	-	-	7	10.50	13.00	2.50
Import tariffs of Germany*	1999-2001	2002-2004	Ltg	103	308	16	4.12	4.02	(0.10)
			Tg	1	4	-	4.11	1.62	(2.49)
Import tariffs of China	1996-1997	2001	Ltg	390	73	9	21.59	17.12	(4.47)
			Tg	8	5	2	10.40	12.33	1.93
Import tariffs of Singapore	1999-2000	2001-2002	Ltg	-	-	-	-	-	-
			Tg	-	-	-	-	-	-
Import tariffs of Mongolia**	1999	2000	Ltg	7	217	2256	4.57	4.54	(0.04)
			Tg	-	2	94	4.90	4.90	-
Import tariffs of Mongolia***	2001	2002	Ltg	-	3014	-	6.42	6.42	-
			Tg	-	94	-	6.85	6.85	-

Source: WTO Integrated Database on MFN Applied Tariff and Imports

\* Tariff change calculations for Germany represent the tariff change calculations for the UK and Italy

\*\* Tariff change calculations for discontinuity in exports from Japan, the US, China, Russia and Singapore to Mongolia

\*\*\* Tariff change calculations for discontinuity in exports from Korea, Hong Kong, and Germany to Mongolia

\*\*\*\* Least traded goods

\*\*\*\*\* Traded goods

**Table 10 Applied MFN tariff changes: Trade liberalization episodes**

Country	The base period	The end-of-period	Type of goods	Decrease	No change	Increase	Average tariff in base period	Average tariff at end of period	Tariff level change
Import tariffs of China	2001*	2005-2007	Ltg	1007	55	79	18.39	9.69	(8.70)
			Tg	27	2	5	13.82	7.42	(6.40)
Import tariffs of the EU	2003-2005	2006-2008	Ltg	397	102	-	3.97	-	(3.97)
			Tg	6	2	-	5.48	-	(5.48)

Source: WTO Integrated Database on MFN Applied Tariff and Imports

\* Only available data for the base period

**Table 11 Relative prices: Structural change episodes**

Trade flows	Period of large increase on extensive margin (Discontinuity)	1996	1997	1998	1999	2000	2001	2002	2003	2004
ExJpMn*	1999-2000			1.00	2.54	2.49				
ExCnMn**	1999-2001		1.00	1.10	1.02	1.93	4.00	2.86		
ExUsMn	1999-2000			1.00	2.36	1.09	3.19	2.98		
ExKrMn	1999-2002			1.00	2.95	1.87	3.44	2.02		
ExDeMn	1999-2000			1.00	2.95	1.87				
ExRuMn	1999-2000		1.00	3.70	8.50	9.36				
ExHkMn	1999-2004					1.00	1.05	1.59	3.56	5.68
ExSgMn	1999-2001			1.00	1.06	1.60	0.85	1.34		
ExMnJp	2002-2003						1.00	1.03	1.11	0.97
ExMnCn	1999-2001	1.00	0.93	1.10	0.43	0.43	0.63			
ExMnUs	1999-2002			1.00	1.21	1.21	1.05			
ExMnKr	1999-2002					1.00	1.13	1.30		
ExMnDe	1999-2000			1.00	5.58	8.06				
ExMnRu	1996-2003					1.00	0.77	0.59	0.02	
ExMnHk	1999-2004							1.00	0.30	0.38
ExMnSg	2000-2001									

Source: Mongolian Custom's Office: Annual trade statistics; OANDA Corporation: Historical average exchange rates

\* Exports of Japan to Mongolia

\*\* Cn is Abbreviation for China

**Table 12 Relative prices: Trade liberalization episodes**

Trade flows	Period of large increase on extensive margin (Discontinuity)	2001	2002	2003	2004	2005	2006	2007
ExMnCn	2004-2007	1.00	0.39	0.54	0.29	0.29	0.41	0.32
ExCnMn	2002-2007	1.00	1.88	0.50	0.69	0.59	0.57	0.73
ExMnEU	2005-2007			1.00	1.64	1.35	1.59	2.15

Source: Mongolian Custom's Office: Annual trade statistics; OANDA Corporation: Historical average exchange rates

**Table 13 Decomposition of trade growth under different cutoff values (growth)**

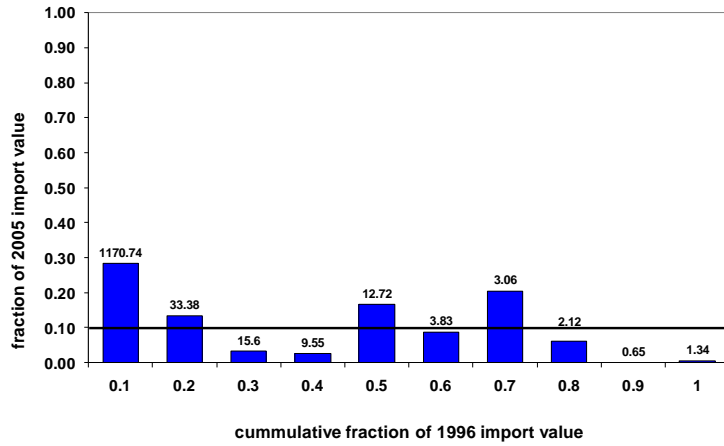
Nr	Country pair	Least traded goods growth in export share	0 cutoff		50000 cutoff		10% cutoff	
			extensive margin	intensive margin	extensive margin	intensive margin	extensive margin	intensive margin
1	Japan to Mongolia 1996-2005	0.2504	0.3546	1.3713	0.1331	0.4140	0.0251	(0.3040)
2	USA to Mongolia 1996-2005	0.6418	0.2567	1.6131	0.0186	0.5803	0.1488	0.5248
3	Korea to Mongolia 1996-2005	0.6381	0.1352	1.8894	0.0289	0.7376	0.0640	0.7194
4	Hong Kong to Mongolia 1996-2005	0.5796	(0.3452)	2.5936	(0.3452)	1.2899	(0.3949)	1.5665
5	Russia to Mongolia 1996-2005	0.9949	1.0663	1.8618	0.3376	0.8399	0.4231	0.6951
6	China to Mongolia 1996-2001	0.6598	0.4265	1.9426	0.1245	0.8655	0.2871	0.8653
7	EU* to Mongolia 1996-2005	0.7999	0.1420	1.7195	0.0132	0.6002	0.0598	0.6758
8	Singapore to Mongolia 1996-2005	0.4654	0.2456	1.3651	0.0429	0.3599	0.1851	0.1758
9	Mongolia to Hong Kong 1996-2005	0.9993	3.4304	(2.0384)	3.2246	(3.8075)	3.2135	(3.5695)
10	Mongolia to Japan 1996-2005	1.0000	1.9647	0.4476	1.9613	(0.9979)	1.9586	(1.6492)
11	Mongolia to US 1996-2005	0.8382	(0.6168)	4.3512	(0.6561)	2.6500	(0.6561)	2.6500
12	Mongolia to China 1996-2001	0.8799	0.2263	3.1314	0.2359	1.6606	0.2774	0.9667
13	Mongolia to Korea 1996-2005	1.0000	0.1160	3.2890	0.0811	1.6477	0.0811	1.4312
14	L** Mongolia to EU 2002-2007	0.3381	0.7125	1.4977	0.6785	0.6122	0.6125	0.2950
15	L China to Mongolia 2001-2007	0.7810	0.4626	0.5785	0.3049	0.7362	0.3047	0.7364
16	L Mongolia to China 2001-2007	0.4000	0.4626	0.4963	0.4923	0.5662	0.1770	0.8640

Source: Mongolian Custom's Office: Annual trade statistics

\* Calculations for the EU representative for Germany, the UK and Italy

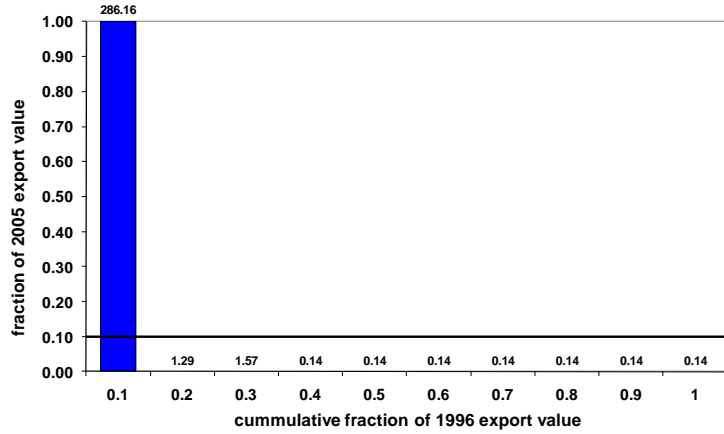
\*\* L stands for liberalization episode

Figure 1 Composition of exports: Japan to Mongolia



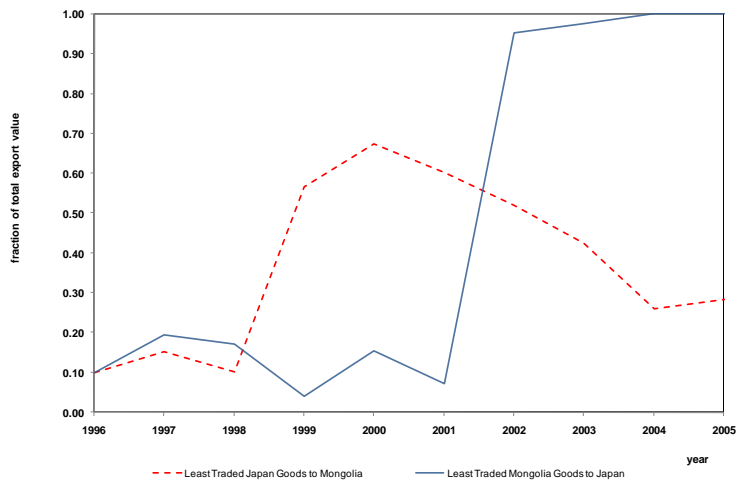
Source: Mongolian Custom's Office: Annual trade statistics

Figure 2 Composition of exports: Mongolia to Japan



Source: Mongolian Custom's Office: Annual trade statistics

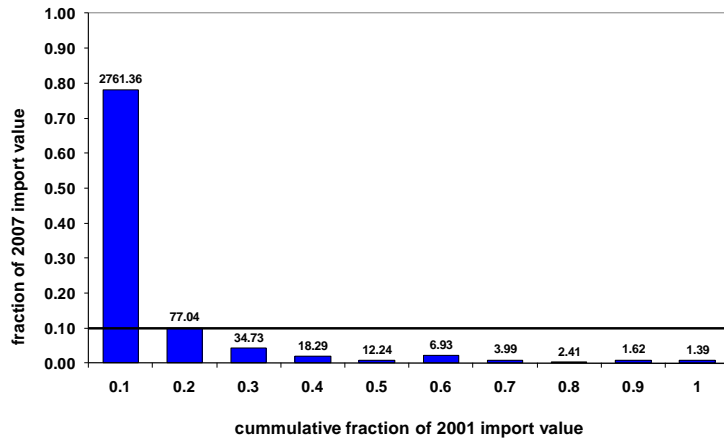
Figure 3 Least traded goods: Mongolia and Japan



Source: Mongolian Custom's Office: Annual trade statistics

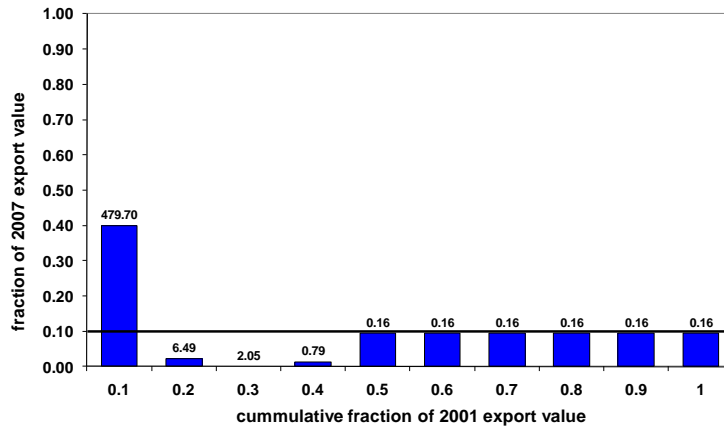


Figure 4 Composition of exports: China to Mongolia



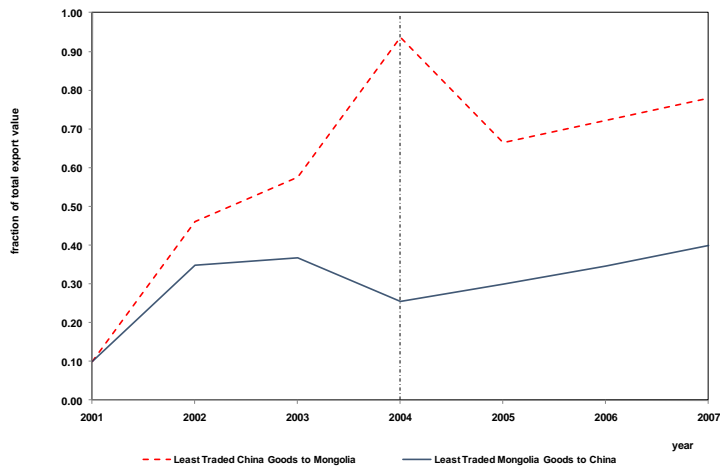
Source: Mongolian Custom's Office: Annual trade statistics

Figure 5 Composition of exports: Mongolia to China



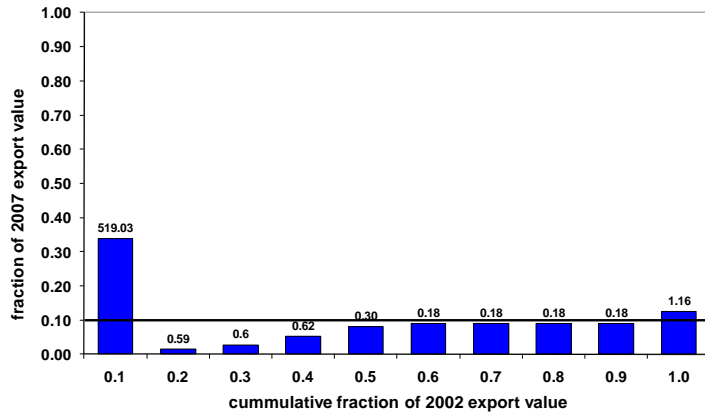
Source: Mongolian Custom's Office: Annual trade statistics

Figure 6 Least traded goods: Mongolia and China



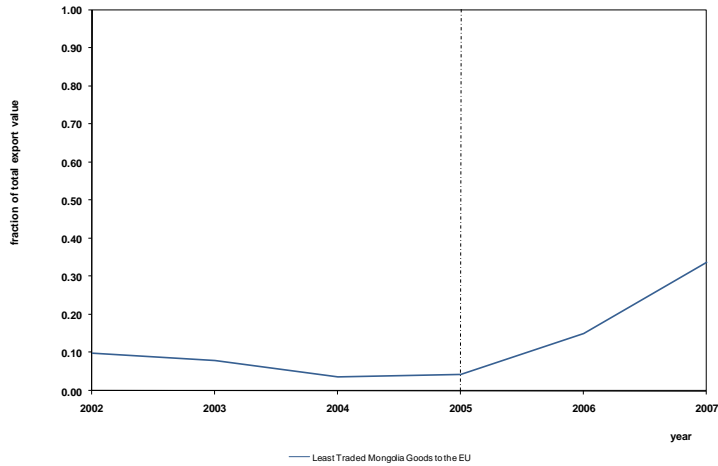
Source: Mongolian Custom's Office: Annual trade statistics

Figure 7 Composition of exports: Mongolia to EU



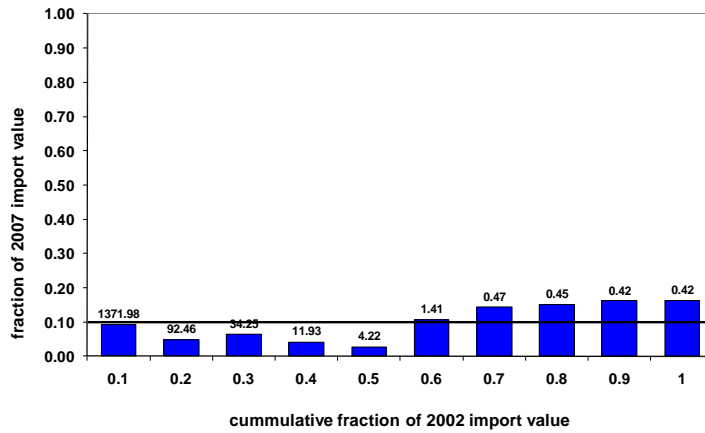
Source: Mongolian Custom's Office: Annual trade statistics

Figure 8 Least traded goods: Mongolia to EU



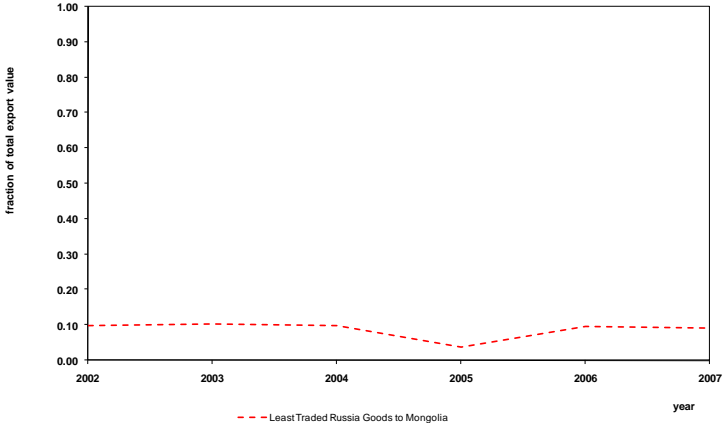
Source: Mongolian Custom's Office: Annual trade statistics

Figure 9 Composition of exports: Russia to Mongolia



Source: Mongolian Custom's Office: Annual trade statistics

Figure 10 Least traded goods: Russia to Mongolia



Source: Mongolian Custom's Office: Annual trade statistics