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# Export Differentiation in Transition Economies

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## Abstract

I investigate changes in the structure of trade of seventeen transition economies between 1996 and 2006, focusing on differences across three types of products – homogeneous goods, reference priced goods, and differentiated products. I examine shares of exports of each type of good, intensive and extensive margins, and the hazard of exporting. While there are cross-country differences in the distribution of export shares and in intensive and extensive margins, largest differences exist in the hazard of exporting. There are significant differences in the hazard both across countries and time.

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# 1 Introduction

Transition economies are typically lumped together because they started making a transition from centrally planned economies to market oriented economies in the early 1990s. In the twenty or so intervening years these economies have gone through a stark transformation, with varied outcomes and degrees of success. Some have joined the European Union and have made large strides in catching up to the developed world, some are well on their way, while others are struggling. The focus of this paper is to evaluate changes in the structure of exports of seventeen transition economies of Central and Eastern Europe from the mid-1990s to the late-2000s. A particular attention is paid to differences in export differentiation and changes in the structure of exports of three broadly defined product types: homogeneous goods, reference priced goods, and differentiated products. I investigate three dimensions of exports: distribution of shares of exports across the three product types, intensive and extensive margins, and the hazard of exporting.

I focus on transition economies as they have made a stark and sudden transformation into market economies. Such a change in the basic organization of economic activity likely resulted in significant changes in export patterns as the pattern of specialization of production along the lines of comparative advantage followed incentives provided by markets, rather than central planners. As a consequence one could expect to observe a number of changes in the structure of exports of these economies some twenty years after the transformation. This is precisely what I find using annual export data between 1995 and 2008 recorded at the 6-digit HS level. The basic unit of observation in the analysis is an export relationship, an observation of a country, Croatia, exporting a product, wooden furniture, to an importing country, Australia.

A simple glance at export shares across the three product types reveals that changes have taken place and were different across these economies. While most have increased the

share of differentiated goods in their exports, some have increased the share of homogeneous goods and reference priced goods. Larger economies tend to increase the share of their exports in homogeneous goods, while more developed ones tend to increase the share of differentiated goods. This is indicative of different patterns of specialization and comparative advantage. To better understand these differences I delve deeper into the structure of exports by examining the intensive and extensive margin.

The intensive margin is defined as the average value of exports per relationship. Most countries have increased the intensive margin across all product types, with most having the largest intensive margin in homogeneous goods. The extensive margin is defined as the number of export relationships a country has in each product category. All countries, across the board, have increased their extensive margin over time developing new export relationships. However, they have done it in somewhat different ways. Some have increased the number of partners they export a product to, while others have increased the number of products they export to a particular country. For most the extensive margin is largest in differentiated goods.

The investigation of intensive and extensive margins contributes to the literature on margins of trade. Funke and Ruhwedel (2001) found the extensive margin of both exports and imports of 19 OECD countries to be positively correlated with per capita income. Hummels and Klenow (2005) examine a number of models and their predictions about how larger economies export more, finding that the extensive margin accounts for 60 percent of the greater exports of larger economies. Richer economies export higher quality goods, while economies with more workers export higher quantities but not at higher prices. Schott (2004) finds similar evidence by examining the intensive margin of U.S. imports – richer countries export at higher prices. Besedeš and Prusa (2010) find that the intensive margin plays a more important role in differences in the growth of exports between developed and developing countries. I show that similar to the findings of Funke and Ruhwedel (2001),

per capita income affects the extensive margin of exports of transition economies positively across all three product types. In addition, the size of the economy affects positively the extensive margin across all product types. Per capita income affects the intensive margin of homogeneous and reference priced goods negatively, while having no effect on the intensive margin of differentiated goods. Larger economies tend to have a larger intensive margin for every product type.

The last dimension I examine is the hazard of exporting which is the conditional probability that an export relationship will fail having survived up to the current period. Put differently, the hazard describes duration of exports – the number of consecutive years that an export relationship was active since its inception. Large differences across countries exist in the hazard of exporting, both across countries for the entire period as well as across and within countries for three subperiods, 1996–1998, 2000–2002, and 2004–2006. For the entire period, the hazard seems similar across the three product types. However, time hides differences and changes. Between 1996 and 1998, new export relationships in both reference priced and homogeneous goods had higher hazard rates than differentiated goods, while there are no differences across the three groups of products between 2000 and 2002. Between 2004 and 2006 differences are reversed – homogeneous and reference priced goods have a lower hazard, indicating that significant changes have taken place over time. While a broad trend is that the hazard for differentiated goods increases at the fastest rate, there is no uniformity in differences in the hazard across product types and across countries and time. For some countries differences across product types are always present, while for others they exist sporadically and change over time.

The analysis of the hazard of exporting makes a contribution to the duration of trade literature started by Besedeš and Prusa (2006a, 2006b). They were the first to examine duration of U.S. imports as well as how it differed across product types finding U.S. imports of homogeneous goods to be facing a higher hazard than differentiated goods. There have been a

number of follow up papers increasing the understanding of duration of trade. Besedeš (2008) shows a search cost model fits duration data well in that it can explain the preponderance of short and small valued relationships. Nitsch (2009) examines duration of German import trade and finds similar results. Brenton, Saborowski, and von Uexkull (2009) find evidence of learning-by-doing decreasing the hazard of exporting of developing countries, while Jaud, Kukenova, and Strieborny (2009) find that financial development improves export survival of developing countries by reducing the costs of external finance to firms. In this paper I show that differences in the hazard of exporting across product types in transition economies are not as large as was the case for imports of developed economies of the U.S. and Germany. In addition, there are two important changes taking place. Firstly, the hazard of exporting homogeneous goods become lower than that of differentiated goods by the end of the period analyzed. Secondly, the hazard of new relationships increases over time across the three product types and across all countries.

This paper proceeds as follows. Section 2 discusses the data set I use. Sections 3 and 4 explore how the structure of exports, namely the shares of exports of each product type and intensive and extensive margins, change over time and how they relate to the economic size of a country as well as the level of development. Section 5 focuses on the hazard of exporting.

## **2 Data**

I use data on exports of seventeen transition economies of Central and Eastern Europe between 1995 and 2008 available through the UN's Comtrade database. The majority of the analysis relies on the 1996 through 2006 period. Data for 1995, 2007, and 2008 are primarily used in the analysis of the hazard of exports in section 5. The seventeen countries in the sample are: Albania, Azerbaijan, Bulgaria, Croatia, the Czech Republic, Estonia,

Georgia, Hungary, Latvia, Lithuania, FYR Macedonia, Moldova, Poland, Romania, the Russian Federation, the Slovak Republic, and Slovenia.<sup>1</sup> I use data recorded at the 6-digit HS 1992 classification. These data contain a varied mix of countries: small (such as Albania) and large (Russia), poor (Moldova) and rich (Slovenia), new members of the EU (Poland) and countries still outside the EU (Croatia).

I classify products into three types, differentiated, reference priced, and homogeneous following the Rauch (1999) classification. Rauch (1999) classified 4-digit SITC codes into the three types. Homogeneous goods are products traded on organized exchanges (such as commodities markets) resulting in a single price for the product regardless of the identity of the supplier. These goods are essentially commodities.<sup>2</sup> Reference priced goods are not traded on organized exchanges, but a single reference price for all suppliers still exists, usually determined by trade publications. While a centralized market does not form the price common to all suppliers, there is no differentiation of the product across suppliers, resulting in a single price common to all suppliers.<sup>3</sup> Differentiated products are those for which there are no organized exchanges and for which there is no single prevailing price common to all producers. These can most easily be thought of as consumer goods, for which there is differentiation across suppliers resulting in different prices.<sup>4</sup> Given the focus on differentiation of exports, data on products not classified by Rauch's classification are omitted.

Additional data employed come from several sources. GDP and GDP per capita come

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<sup>1</sup>Data on Albania, Azerbaijan, Bulgaria, Georgia, and Russia are available from 1996 onwards.

<sup>2</sup>Examples include frozen swine livers (HS6=020641), buckwheat (100810), yarn, with >85% wool or fine animal hair (510910), silver powder (710610), and master alloys of copper (740500).

<sup>3</sup>Examples are titanium ores and concentrates (261400), sodium (280511), calcium chloride (282720), hides and skins of reptiles, fresh (410320), greaseproof papers, in rolls or sheets (480620).

<sup>4</sup>Examples are stuffed pasta (190220), baths, shower-baths, and wash-basins (392210), parquet panels, of wood (441830), men's or boy's jackets and blazers (610331), cooking appliances and plate warmers for solid fuel (732113), domestic vacuum cleaners (850910), telephone sets (851710), and motorcycles, side-cars, reciprocating engine with reciprocating internal combustion piston engine of a cylinder capacity exceeding 500 cc but not exceeding 800 cc (871140)

from World Bank's World Development Indicators, while language, distance, contiguity, and colonial history come from CEPII<sup>5</sup>. Measures of economic and political risk come from the International Risk Guide<sup>6</sup>.

### 3 Export Shares

I begin the examination of the extent of changes in export differentiation by examining changes in export shares of the three types of products, homogeneous, reference priced, and differentiated. I examine changes between two three-year averages, 1996 through 1998 and 2004 through 2006. Throughout the paper I refer to the former period by its first year and the latter by its last year. I use three-year averages rather than a single year to smooth out any sharp year-to-year differences. Across all seventeen countries, the share of both homogeneous and reference priced goods has decreased: from 12.2% to 8.9% for homogeneous and from 30.5% to 26.1% for reference priced goods. Differentiated goods, which constituted more than a half of exports in 1996, increased their share by almost eight percentage points to 65%, almost two thirds of all exports.

Rather than examining changes in the distribution of export shares across the three product types for each country on its own, I examine how these changes relate to the size of an economy, as measured by GDP, and the level of development or wealth, as proxied by the per capita GDP. These two variables are chosen for two reasons. One has to do with the goal of providing a basic understanding of how the size of a transition economy and its level of development relate to changes in the structure of its exports. The other, related to the first, has to do with the understanding that these economies have undertaken a sudden transition into a market-based organization of economic activity which has likely resulted in a number of changes in both the pattern of specialization in production and the comparative

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<sup>5</sup><http://www.cepii.fr/anglaisgraph/bdd/distances.htm>

<sup>6</sup><http://www.prsgroup.com/ICRG.aspx>



advantage. By using GDP and GDP per capita one can better understand how cross-country differences in economic size and level of development relate to differences in the structure of exports.

The first column of Table 1 reports product-type specific coefficients for an ordinary least squares regression of export shares on GDP, per capita GDP, and a time trend. I estimate product type specific coefficients to examine the different impacts the covariates may have on each product type and include dummies for reference priced and homogeneous goods to control for additional unobserved product type specific effects. The dependent variable and all independent variables are expressed in natural logarithms. Thus, the estimated coefficients represent elasticities of product shares.

GDP plays a role in explaining only the share of homogeneous goods, while GDP per capita is important for all three types. The time trend does not help explain the variation of export shares for any of the three product types. For homogeneous goods larger economies exhibit larger export shares, with twice as large an economy having a 21.7% larger share of homogeneous goods in exports. The effect of GDP, the economic size, is attenuated by the effect of GDP per capita, or the wealth of a country. A twice as rich an economy has an 83.1% lower share of homogeneous goods in its exports. This effect is largely due to the effect of economically large, but relatively poor Russian Federation. Omitting Russia from the regression results in a still positive effect of GDP, but smaller and statistically not significant, while the effect of GDP per capita remains largely unaffected.

For reference priced products, the coefficient for GDP is not statistically significant, though it indicates that larger economies tend to have marginally lower export shares. The coefficient for GDP per capita indicates that richer economies have a lower share of exports dedicated to reference priced products. An economy with twice the GDP per capita will have by a fifth lower share of exports in reference priced goods. The effect of GDP per capita is opposite for differentiated goods. A twice as rich an economy will have by a third larger share

of exports in differentiated goods. Tests of the equality coefficients indicate that the effect of GDP for homogeneous goods is different than for reference priced and differentiated goods, individually and jointly, while there is no statistical difference between its effect for reference priced and differentiated goods. The effect of GDP per capita is statistically different across the three product types, in either individual or joint comparisons. These results indicate that richer transition economies tend to have larger shares of exports of differentiated goods and lower shares of homogeneous and reference priced goods. In other words, there is evidence that richer economies are more likely to specialize in differentiated goods. I now turn to examining differences in intensive and extensive margins of exports.

## 4 Intensive and Extensive Margins

The intensive margin captures the depth of a country's trade and is usually measured as the average value of trade per trade relationship, while the extensive margin captures the breadth of trade and is measured as the simple count of trade relationships. For the purpose of this paper, I define the intensive and extensive margins following Besedeš and Prusa (2010). A trade relationship is defined as an exporter–importer–product triplet or from the perspective of a single exporting country as an importer/destination–product pair. The intensive margin is then the average exported value per relationship, while the extensive margin is the simple count of relationships in every year. Most papers on margins of trade define the intensive margin similarly, while the definition of the extensive margin is different to some extent. For example, Eaton et al. (2008) and Evenett and Venables (2002) define the extensive margin similarly, while Helpman, Melitz, and Rubinstein (2008) and Felbermayr and Kohler (2006) define the extensive margin as the number of trading partners a country has, and Amiti and Freund (2010) define it as the number of products a country exports. I also examine two approaches similar to the latter two definitions.

## 4.1 Intensive Margin

There are several interesting broad patterns in changes in the intensive margin across the transition economies. In the vast majority of countries the intensive margin of each product type increased. Only Moldova and Poland experienced a decline in the intensive margin of each product type. For most countries the intensive margin is the largest for homogeneous goods, while it is the smallest for differentiated products, both at the start of the period under study and its end. This finding is not all too surprising given that most goods are classified as differentiated (some 60% of all product codes), while the homogeneous group of products is composed of the least number of product codes (some 6%).

In the second column of Table 1 I estimate a similar regression to that on the shares of exports, except that the dependent variable is now the size of the annual intensive margin in logs. For both homogeneous and reference priced goods, the time trend indicates that the intensive margin increases over time. In addition, for both homogeneous and reference priced goods, larger GDP results in a larger intensive margin, with a smaller effect for reference priced goods, while larger GDP per capita results in a smaller intensive margin, with the effect again smaller for reference priced goods. GDP increases the intensive margin of differentiated goods, similar in magnitude to reference priced goods (they are not statistically different from each other), while GDP per capita has no statistically significant effect, though it does indicate a larger intensive margin. These results indicate that larger economies have a larger intensive margin across all three product types, while richer economies tend to have lower intensive margins for homogeneous and reference priced goods.

## 4.2 Extensive Margin

As a direct consequence of some 60% of all products being defined as differentiated goods, the extensive margin of every country is largest in differentiated goods – they have the

largest number of export relationships – while homogeneous goods have the smallest extensive margin. Perhaps more interesting than the sheer size of the extensive margin is that every country has been able to grow its extensive margin in every product type by exporting old products to new countries, or new products to old countries, or new products to new countries, where new is defined as not necessarily new, but rather not exported (to) previously.<sup>7</sup> Poland made the largest gains of any country with the extensive margin in each product type increasing by a factor of four to five, largely explaining the earlier observation on the decrease of the intensive margin of every product type for Poland.

Column 3 of Table 1 contains results from regressing the size of the extensive margin (in logs) on the time trend, GDP, and GDP per capita. This regression produces the most uniform results across the three product types: in every case larger GDP results in a larger extensive margin as does larger GDP per capita. The effects of both covariates are largest for differentiated goods, followed by reference priced goods. The time trend is marginally significant only for differentiated goods. Larger and richer economies have a larger extensive margin of exports in every product type.

More interesting dimensions of the extensive margin are revealed by the last two columns of Table 1. In addition to examining the extensive margin through the prism of the number of export relationships, I examine the average number of countries to which a product is exported and the average number of products exported to each partner. With a few exceptions, all countries have the largest number of partners per product for differentiated goods, which should not be surprising since there are varieties of differentiated goods which allow countries to export those goods to more partners.

Column 4 of Table 1 shows the familiar regression for the number of partners per product (in logs). Here again the results are similar across product types. The time trend indicates

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<sup>7</sup>The only exception is Azerbaijan whose extensive margin of homogeneous goods decreased by a fifth between 1994 and 2006, though its differentiated goods margin more than tripled.

that every country increases the number of partners it exports a given product to over time. Larger economies, as indicated by GDP, export to more countries, with the effect strongest for differentiated goods. The only significant difference is in the effect of per capita GDP. Richer economies will export a given differentiated product to more countries, while the effect is not significant for the other two product types, though the signs indicate that richer economies export reference priced products to more and homogeneous goods to fewer countries.

The last dimension of the extensive margin which I examine is the number of products exported to each importer. Here again the average number of products per country is the largest for differentiated products for every country, a consequence of the dominance of differentiated goods in terms of the number of products in the category. The last column of Table 1 examines the effect of GDP and GDP per capita on the average number of products exported to a partner country. The time trend is not important for any of the three product types. Larger economies tend to export more reference priced and differentiated goods than smaller economies, with no effect for homogeneous goods. Richer economies tend to export more of each product type, with the effect strongest for reference priced goods and weakest for differentiated goods. I now turn to examine the hazard of exporting.

## 5 Hazard of Exporting

The main interest in this section is shedding light on differences in the hazard of exporting across the three product types, building on the work of Besedeš and Prusa (2006b). I first estimate the hazard pooling across all seventeen transition economies, before estimating it for each country separately. Then I examine how the hazard across the different product types has changed between 1996 and 2006.

To estimate the hazard, annual data are transformed into relationships reflecting con-

tinuous spells of service. A spell of service consists of the consecutive years during which a particular relationship is active, for example Croatia exporting wood to Italy from 1999 continuously until 2004, resulting in a spell of 6 years. There are two censoring issues present in duration of trade data. All relationships still active in the last observed year, 2008 in this case, are right censored as it is unknown exactly how long they are. All relationships observed in the first year, 1996, are left censored as it is not clear when they started. Since left-censored spells are more problematic from the econometric point of view, all left-censored spells are omitted. It is for this reason that 1995 data are used, while the analysis starts in 1996. Using 1995 data allows me to identify the truly new spells in 1996. Thus, the analysis herein is confined to new relationships occurring after 1996. In a somewhat similar vein, data for 2007 and 2008 are used only to see which of the 2006 new spells survive those two years. Newly created spells in those two years are omitted as they cannot be observed for more than two years. I estimate the hazard using a probit model where each spell is split into annual observations. I model the dependence of the hazard on time in the most flexible way by incorporating dummy variables for each year of the spell.

In modeling the hazard of trade, Besedeš and Prusa (2006b) and Besedeš (2008) have used the Rauch and Watson (2003) search cost model to examine how a buyer locates a foreign supplier and establishes a relationship. Besedeš and Prusa (2010) use an extension of the Melitz (2003) and Segura-Cayuela and Vilarrubia (2008) models allowing for uncertainty to play a role in determining the fragility of trade relationships. In this paper I use a simpler extension of the Melitz (2003) model. Suppose foreign suppliers are subject to exogenous, serially correlated productivity or product appeal shocks,  $\mu$ . According to the Melitz (2003) model, exports are more likely to come from suppliers that draw a favorable parameter  $\mu$ . Those that draw an especially large  $\mu$  will tend to export a lot. Suppliers that have just started exporting are more likely to exit than those that have exported for a long time because their  $\mu$ 's are closer to the level at which they are indifferent between exporting

and not exporting. Exporters who have been active for a long time are more likely to have drawn a sequence of positive  $\mu$ 's and are likely to have wandered farther from the margin of indifference between exporting and not exporting. Thus, one should expect to observe a lower hazard the longer the relationship.

To explain the hazard of exporting I use the following variables. GDPs of both the exporter and the importer are used to capture the economic size, while per capita GDP is used to capture wealth or the level of development of an economy. International Country Risk Guide data on economic and political risk of both exporters and importers is used to capture the relative stability both in the economic and political realm. Given these economies were in the process of economic transition and are all young democracies, it is important to account for the perceived level of both economic and political risk.

Variables common in the gravity literature are used to control for the strength of relationships between countries, as it likely affects the fragility of trade relationships. Two measures of common language are used, one for two countries sharing the official common language, while the other measures whether more than 9% of the population in two countries speak the same language, capturing the presence of large minorities in bordering countries, a somewhat common feature in the transition economies of Central and Eastern Europe. I use a weighted measure of distance developed by Head and Mayer (2010) which is based on the distance between the largest cities in two countries weighted by the population of those cities. Contiguity indicates whether the exporter and the importer share a border. A dummy is used to indicate whether the two partners were ever a part of the same country, a feature of a number of exporters in the sample<sup>8</sup>, while another dummy captures the existence of a colonial relationship at some point in the history of the two trading partners. Since earlier research has found an important role for the amount of trade with which a relationship

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<sup>8</sup>Mostly true of countries who used to be in the former Soviet Union or Yugoslavia, but also true of some other associations reaching further back in history, such as the Austro-Hungarian Empire.

starts, I include the size of initial exports for each relationship.<sup>9</sup> To capture the experience a country has with a particular product I include a variable counting the number of countries each product is exported to, while the number of products exported to each country reflects the experience with exporting to a particular country. The coefficient of variation of unit values measures the variation in unit values an exporter's products achieve in import markets, normalized by their mean. Besedeš and Prusa (2006b) used this measure to control for diversity or variation of products within each product code. Finally, two dummy variables are used to capture differences in the hazard of exporting reference priced and homogeneous goods relative to differentiated products.

## 5.1 Pooled Results

Table 2 presents hazard estimates pooled across all seventeen exporters. All estimates are presented as coefficients. All continuous variables are used in logs. The resulting coefficient is interpreted as the elasticity of the hazard rate. There is a total of 661,400 trade relationships with complete observations resulting in just over 2 million annual observations. Estimated coefficients on time dummies presented in the first two columns indicate that the baseline hazard is decreasing with time – relative to the first year, the hazard, the conditional probability a relationship will end given that it has survived up to that year, is decreasing as expected, since estimated coefficients are all negative and increasing in absolute value over time. Longer lasting relationships are less likely to fail than newer relationships.

Export relationships of economically larger transition countries face a higher hazard, while exports to larger importers face a lower hazard, though the effect is not strong enough to offset the effect of exporter GDP. The negative effect of larger GDP may be a result of larger economies' larger production capacity and a greater number of firms which are more willing to try to export, but also fail more frequently. Wealthier or more developed

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<sup>9</sup>See Besedeš and Prusa 2006b and Nitsch 2009.



exporters, as indicated by the per capita GDP coefficient, are less likely to fail. This is likely a consequence of more developed countries having more productive firms which are able to survive in export markets for longer spells. Exports to more developed importers, however, are more likely to cease. Given the focus on transition economies, this is likely a consequence of that fact that the majority of firms from these countries face a stiffer competition as they attempt to export to more developed markets. In other words, it is easier for Hungarian firms to maintain their exports to the Czech Republic and Slovenia than to the U.S. or the European Union. Note that in the case of large developed exporters (relatively speaking at least), the effect of per capita GDP more than offsets the effect of GDP, implying that large developed transition economies face a lower hazard of exporting. For large developed importers, the effects of per capita GDP and GDP offset each other.

International Country Risk Guide's measures of economic risk assign a higher value of the index to riskier economies. As indicated by estimated coefficients, higher economic risk, of either the exporting or importing country, is associated with a lower hazard. At first pass this is a surprising result. However, it highlights the role of uncertainty in international trade along the lines of Rauch and Watson (2003). Firms from risky countries will be able to export continuously only when the likelihood of success is relatively high. Firms from countries with low risk are much more likely to be able to export, even for short periods of time, precisely because they embody less risk and are perceived as safer bets. The same reasoning applies to risky importers. More politically unstable exporters face a much higher hazard of exporting, while exports to importers with a higher political risk are less likely to cease.

The standard gravity variables have largely the expected effects. Sharing a common language reduces the hazard, as common language reduces the costs associated with exporting and creates stronger ties between countries. Interestingly, if a significant minority in one or both countries share a language, the hazard is higher. The likely interpretation of this effect

is that having access to a large minority in the importing country, for example, Hungarian firms exporting to Slovakia targeting the Hungarian minority there, encourages many firms to try to export, when some of them would not try to export otherwise. The allure of a large minority essentially tricks some firms into exporting, resulting in more failures. The same interpretation holds if there is a minority in the exporting country trying to export to a majority in another country, for example, ethnic Russians in Latvia exporting to Russia.

The larger the distance between the exporter and the importer, the higher the hazard, reflecting the detrimental effect of higher transportation and other costs associated with conducting trade across large distances. Export relationships with neighboring importers are less likely to fail. If the exporter and the importer used to be a part of the same country or were in a colonial relationship, the hazard is higher. This may be surprising, but the interpretation of both variables is that the existence of such historical links makes the importer a natural market to attempt to break into first. As such, it attracts some firms that otherwise would not attempt to export creating more failures than would otherwise be observed.

The higher the initial value of exports, the lower the hazard. A 10 percentage point higher initial exports roughly reduces the hazard by 7.6 percentage points, ignoring the year effects. This is similar to what other authors have found. Experience with a particular importer, as indicated by the number of products exported, reduces the hazard, as does experience with a particular product, as indicated by the number of countries it is exported to. Both of these effects are similar to the results for four African countries examined by Cadot et al. (2010) and for German imports examined by Nitsch (2009).

A higher coefficient of variation indicates that for products with more variation in unit values the hazard of exporting is higher. This is opposite of the effect found by Besedeš and Prusa (2006b) for U.S. imports where higher variation indicated a lower hazard, supporting their result that relationships with differentiated goods had a lower hazard. For the set of

transition economies the effect is not large – a one percentage point higher coefficient of variation increases the hazard by one tenth of a percentage point. This somewhat surprising result becomes less so once one takes into account differences across product types. Although the dummy for reference priced goods is significant, indicating reference priced goods face a higher hazard, it is of very low magnitude, while the dummy for homogeneous goods indicates there are no differences in the hazard of differentiated and homogeneous goods. This result is in contrast to those of Besedeš and Prusa (2006b) for U.S. imports and Nitsch (2009) for German imports where there are significant differences across product types.

One downside of using the most flexible specification of estimating a hazard model is that the interpretation of estimated coefficients is complicated by the choice of the estimation strategy. Estimating the hazard with probit results in a nonproportional hazard implying that the effect of each covariate depends not only on its coefficient but also the year in the spell.<sup>10</sup> In other words, the effect of a covariate is time-specific. With that in mind it is easier to examine the magnitude of coefficients by plotting the estimated hazard rate. Figure 1 plots the effect of nine covariates. The top six panels show the effect changes in six continuous variables, where the solid line is the estimated hazard evaluated at the means of all variables. The two dashed lines show the effect of increasing and decreasing the variable of interest by its standard deviation. The effect of every covariate changes over time. In terms of the magnitude of the effect, the two experience variables, the number of countries a product is exported to (“Product Experience”) and the number products exported to a country (“Country Experience”) have the largest effect on the hazard. Experience accumulated by participating in international markets is very important to a country’s ability to maintain its exports. The bottom three panels show the effect of three dummy variables, common

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<sup>10</sup>A proportional hazard would imply that each covariate shifts the hazard by the estimated coefficient at every point in the spell by that same amount. While it makes for an easier interpretation, assumptions underlying the proportional hazard models tend to be false in trade duration data sets. See Hess and Person (2010) for a discussion.

language, common border, and product type effects. The former two have sizeable effects, while differences between product types are virtually nonexistent, as indicated by estimated coefficients on those dummies being very close to zero.

## 5.2 Country-Specific Results

The finding that there are few differences across product types is surprising given the results of Besedeš and Prusa (2006b) and Nitsch (2009). However, there is much below the surface of pooling across countries and time. For some countries there are larger differences across product types, as seen from Table 3 which presents estimates for each country separately. In order to conserve space, the year dummy coefficients are not reported, though for every country they indicate the hazard decreases with time.<sup>11</sup> All country level variables are importer specific. Even a cursory glance at the table reveals there are differences in estimated coefficients. While importer GDP reduces the hazard in pooled results, it does so for thirteen of the seventeen countries, and is not significant for three of those (Albania, Macedonia, Moldova). For the remaining five, Bulgaria, the Czech Republic, Latvia, and Lithuania, importer GDP increases the hazard. If these countries export most of their products to large economies, this indicates that by going to large markets some of their firms are overshooting. In the pooled results importer GDP per capita increases the hazard, while in country specific regressions it decreases the hazard for five countries, though it is only statistically significant for Estonia and Russia, indicating these countries have more stable relationships with poorer importers. Economic risk has the same effect as in the pooled regression, with the sole exception of Russia, for which higher economic risk of the importer increases the hazard. This could be a consequence of the potential concentration of Russian exports to economically riskier markets. For four countries, the higher the political risk of the importer, the lower the hazard, with only Poland and Azerbaijan having a statistically significant effect.

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<sup>11</sup>Available on request.

Common official language reduces the hazard in the three transition countries which have partners with common official language, Moldova, Romania, and Russia. In three of the seven countries with a common minority language, Hungary, Macedonia, and the Slovak Republic, it has a beneficial effect of reducing the hazard of exporting while in Moldova and Bulgaria it has the opposite effect. For Azerbaijan the common minority language coefficient is negative, but not statistically significant.

Even distance has a mixed effect across the countries. In six countries, Bulgaria, Latvia, Macedonia, Moldova, Romania, and Russia, the larger the distance, the lower the hazard, though it is only significant for Bulgaria and Russia. Common border increases the hazard for Albania, Azerbaijan, Georgia, Macedonia, and Moldova, indicating these countries have more fragile export relationships with their neighbors. Of the nine countries which used to be in the same country with an importing partner, six, the Czech Republic, Georgia, Hungary, Poland, the Slovak Republic, and Slovenia, have a lower hazard of exporting to an importing partner with which they used to be in the same country at some point. The effect is not statistically significant, though positive for two, Croatia and Macedonia, and is positive and significant for Lithuania. The effect of a colonial history is also mixed.

Higher initial exports reduce the hazard across all seventeen countries, as does experience with a particular product and a particular country. The effect of the coefficient of variation of unit values is mixed. In Estonia, Georgia, Macedonia, Moldova, Romania, and Slovenia, it reduces the hazard, while in other countries it increases the hazard.

Finally differences across product types vary across countries and are sizeable in some cases. There are no differences across product types for Albania and Moldova. In Azerbaijan, Croatia, the Czech Republic, Latvia, Lithuania, Russia, and Slovenia, both reference priced and homogeneous goods have a lower hazard, while in Estonia, Georgia, Hungary, Poland, and the Slovak Republic, both have a higher hazard than differentiated products. Figure 2 illustrates differences in the hazard across the three types of products for four countries,

Bulgaria, Croatia, Poland, and Russia. In the case of Bulgaria, Croatia, and Russia homogeneous goods have a lower hazard than differentiated goods. In Poland's case differentiated goods have the lowest hazard, though differences across product types are not large.

### 5.3 Temporal Differences

A final step in the analysis is to examine whether there have been changes in the hazard of exporting of various product types over time. To that end Table 4 presents estimates of the reference priced dummy in the pooled and country-specific regressions for the entire period as well as three subperiods: relationships starting between 1996 and 1998, 2000 and 2002, and 2004 and 2006. Table 5 does the same for homogeneous goods.

Figure 3 plots the estimated hazard for each product type pooled across all countries for the first three years in each of the three subperiods. I plot only the first three years as that is the largest number of years available for the 2004-2006 period. As can be seen from the figure as well as pooled coefficients in Tables 4 and 5, the finding of virtually no differences across product types when pooling across countries and years is hiding temporal changes. Across all countries differentiated goods have the lowest hazard for export relationships started between 1996 and 1998, while homogeneous goods have the highest hazard. Over time these differences reverse themselves and by 2004 to 2006, new relationships with homogeneous goods have a lower hazard than both reference priced and differentiated goods. Note that the hazard is increasing over time for each product type. However, the change in the ordering of product types in terms of the associated hazard is driven by a faster increase in the hazard for differentiated goods than for homogeneous and reference priced goods. This broad pattern is confirmed when examining country specific results.

For all countries the hazard of exporting reference priced goods changes over time. In the early period relationships involving reference priced products are more fragile than those

involving differentiated goods, but become less fragile with time. For some countries there is a clear direction of change. Azerbaijan and Macedonia start with a lower hazard for reference priced and move to no difference between reference priced and differentiated goods. Bulgaria, Georgia, Romania, and the Slovak Republic have the opposite experience. They start with a higher hazard for reference priced goods and end with no difference. For the Czech Republic, Russia, and Slovenia, reference priced goods have a consistently lower hazard than differentiated goods, signaling that reference-priced-product relationships are more stable. Poland starts with a higher hazard for reference priced goods only to finish with a lower hazard. Croatia, Estonia, Latvia, and Lithuania all start with no difference between the two product types and end with reference priced products having a lower hazard and less fragile relationships.

Homogeneous goods begin with a higher hazard than differentiated goods in the pooled regression, but finish with a lower hazard. Thus, relationships involving homogeneous goods are more fragile initially, only to become more stable relative to differentiated products as time progresses. Keep in mind that decrease in fragility of homogeneous-goods relationships is relative since the figures indicate that the hazard increases for all three product types over time. In only six countries, Estonia, Georgia, Hungary, Macedonia, Moldova, and Romania, do homogeneous goods have a higher hazard than differentiated goods at the end of the period. In Bulgaria, the Czech Republic, Latvia, Lithuania, and Poland relationships involving homogeneous goods have either a higher hazard or are no different than differentiated goods if they start between 1996 and 1998, but for 2004 through 2006 new relationships homogeneous goods have a significantly lower hazard.

Figure 4 plots estimated hazard for the three subperiods for Lithuania, Poland, and Russia. Again one can conclude that much detail is hidden below the surface when examining results from pooling across time and countries. Lithuanian export relationships started between 1996 and 1998 have the lowest hazard when they involved differentiated goods and

highest when they involved homogeneous goods. By 2000 to 2002 this pattern reverses with homogeneous goods having the lowest hazard. One can also observe that the hazard for homogeneous goods decreases, while that for differentiated goods increases. By 2004–2006 the difference between homogeneous and differentiated goods increases, mostly due to an increasing hazard of differentiated goods. In addition, there are now clear differences between reference priced and differentiated goods as well. A similar pattern can be observed for Poland as well. Homogeneous goods start with the highest hazard. In the middle subperiod differences across product type diminish, while in the last subperiod homogeneous goods have the lowest hazard and differentiated goods have the highest hazard. Note also that reversal of the ordering of the hazard across product type seems to be driven by increases in the hazard for differentiated goods, rather than a decrease in the hazard for homogeneous goods. In the case of Russia, the only change in the ordering is that homogeneous and reference priced goods switch places by the 2004–2006 period. Note that there is a significant increase in the hazard of Russian exporting relationships which can be observed by comparing the three graphs.

There are two broad patterns to note in terms of how the hazard of exporting changes over time. For most countries the hazard of new exporting relationships involving homogeneous goods becomes lower than that of differentiated goods. In addition, the hazard of all product types increases over time, with the increase being the largest for differentiated goods. The latter pattern points to an increased fragility of export relationships of transition economies, a likely consequence of the fact that these countries are expanding their extensive margins over time. The new export relationships may be attempts by less productive firms (firms closer to the threshold level of productivity necessary to export), which can account for the higher hazard over time as some of these firms ultimately realize they cannot sustain their exporting activities. Both of these changes point to the fact that the extent and nature of differentiation of trade of transition economies is still evolving and changing. Both of these



may be a consequence of the nature of changes on the intensive and extensive margins. Over time, the average intensive margin for homogeneous and reference priced goods increases, while it remains roughly constant for differentiated goods (see Table 1). At the same time, the extensive margin increases the most for differentiated goods, though there is an increase in the number of destinations transition economies export all three product types to. The lack of an increase in the intensive margin coupled with an increase in the extensive margin for differentiated goods may account for the faster rate of increase in their hazard rate, especially keeping in mind that the value of exports at the start of a relationship reduces the hazard. The increase in the intensive margin of homogeneous and reference priced goods offsets some of the upward pressure on their hazard.

## 6 Conclusion

In this paper I examine changes in the structure of exports as it relates to product differentiation in seventeen transition economies between 1996 and 2006. Not surprisingly, given the different nature and level of development, and the different paths these economies have taken since the mid-1990s, changes in the extent and nature of differentiation of exports differ across the countries. There are some broad similarities. Most countries have increased the export share of differentiated goods, while only a few have increased the share of homogeneous goods. The shift toward differentiated goods at the expense of reference priced and homogeneous goods is strongest in richer economies, while larger economies tend to increase the share of homogeneous goods. Despite this pattern, or perhaps because of it, the intensive margin in homogeneous goods starts to dominate by 2006. Larger economies tend to increase the intensive margin in all three product types, while richer economies tend to decrease the intensive margin in homogeneous and reference priced goods.

All countries have increased the extensive margin of trade in all three product types,

while most have increased the number of countries they export to per product and the number of products they export per country. Both larger and richer economies increase the extensive margin in all three product types as measured by the number of relationships. Larger economies increase the number of countries they export to per product, regardless of the type of the product, while only richer countries do so for differentiated goods. Richer countries increase the number of products they export per country for all three groups of products and larger economies do so for reference priced and differentiated goods.

The largest differences across countries are unearthed in the hazard of exporting. While pooled hazard estimates across all countries produce results found in other papers, there are significant differences across countries as well as time. For example, in pooled results there are small differences in the hazard of the three product types. But this apparent lack of differences hides significant changes which have occurred over time. Estimates of the hazard of exporting of new relationships formed between 1994 and 1996, 2000 and 2002, and 2004 and 2006 reveal that reference priced and homogeneous goods both had a higher hazard than differentiated goods for the first subperiod. For those relationships formed in the second subperiod there are no differences across product types, while in the third subperiod reference priced and homogeneous goods have a lower hazard. In addition, there is an increase in the hazard of exporting of all three product types across all countries, a consequence of their increased participation in international trade. While the hazard increase for all three product types, differentiated goods have experienced the largest increase in the hazard of exporting over time.

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Table 1 - Export shares, intensive, and extensive margin regressions

	Shares of Exports	Intensive Margin	Extensive Margin	Partners per Product	Products per Partner	
Homogeneous	Time trend	0.099 (0.142)	0.315** (0.138)	0.144 (0.129)	0.247*** (0.080)	-0.068 (0.094)
	GDP	0.217** (0.099)	0.768*** (0.074)	0.364*** (0.078)	0.251*** (0.066)	0.088 (0.065)
	GDP per capita	-0.831*** (0.147)	-0.668*** (0.113)	0.334** (0.153)	-0.157 (0.112)	0.615*** (0.124)
Reference Priced	Time trend	-0.030 (0.040)	0.219*** (0.066)	0.111 (0.139)	0.200** (0.080)	-0.083 (0.091)
	GDP	-0.037 (0.061)	0.411*** (0.034)	0.466*** (0.086)	0.268*** (0.051)	0.176** (0.074)
	GDP per capita	-0.220*** (0.070)	-0.291*** (0.089)	0.568*** (0.177)	0.123 (0.097)	0.667*** (0.139)
Differentiated	Time trend	-0.048 (0.067)	0.040 (0.113)	0.272* (0.141)	0.232*** (0.070)	0.015 (0.092)
	GDP	-0.026 (0.060)	0.420*** (0.106)	0.468*** (0.083)	0.351*** (0.050)	0.127** (0.052)
	GDP per capita	0.357*** (0.085)	0.231 (0.148)	0.623*** (0.163)	0.306*** (0.073)	0.563*** (0.146)
Reference priced goods	4.152* (2.081)	4.611** (1.936)	-0.459 (0.600)	3.344*** (0.752)	-2.933*** (0.693)	
Homogeneous goods	1.319 (3.293)	-0.661 (3.101)	1.980** (0.901)	5.638*** (1.331)	-2.126*** (0.620)	
Constant	1.903 (1.132)	-6.364*** (2.009)	-7.277*** (2.335)	-8.664*** (1.262)	-1.302 (1.492)	
Observations	597	597	597	597	597	
R-squared	0.838	0.754	0.879	0.673	0.922	

All variables in logs

Parameter estimates (std. error) with \*, \*\*, \*\*\* denoting significance at 10%, 5%, and 1%.

Robust standard errors in parentheses

Table 2 - Estimates of the hazard of exporting across all exporters

Year two	-0.501*** (0.003)	Exporter GDP	0.054*** (0.001)	Distance	0.101*** (0.002)
Year three	-0.790*** (0.003)	Importer GDP	-0.016*** (0.001)	Contiguity	-0.209*** (0.004)
Year four	-1.039*** (0.004)	Exporter GDP per capita	-0.096*** (0.003)	Same country	0.107*** (0.004)
Year five	-1.092*** (0.006)	Importer GDP per capita	0.015*** (0.002)	Colony	0.077*** (0.006)
Year six	-1.248*** (0.007)	Exporter economic risk	-0.087*** (0.011)	Initial exports	-0.076*** (0.000)
Year seven	-1.325*** (0.009)	Importer economic risk	-0.191*** (0.009)	Number of products	-0.195*** (0.001)
Year eight	-1.485*** (0.011)	Exporter political risk	1.081*** (0.020)	Number of countries	-0.380*** (0.002)
Year nine	-1.521*** (0.015)	Importer political risk	-0.073*** (0.012)	Unit values coefficient of variation	0.014*** (0.001)
Year ten	-1.674*** (0.021)	Common official language	-0.314*** (0.015)	Reference priced goods	0.009*** (0.003)
Year eleven	-1.733*** (0.032)	Common ethnic language	0.042*** (0.006)	Homogeneous goods	-0.002 (0.006)
Constant	-2.015*** (0.104)				

Observations 2,077,344

No. Relationships 661,400

Log-Likelihood -1,072,060

All continuous variables in logs

Parameter estimates (std. error) with \*, \*\*, \*\*\* denoting significance at 10%, 5%, and 1%.

Robust standard errors in parentheses

Table 3 - Hazard of exporting by exporter

	Albania	Azerbaijan	Bulgaria	Croatia	Czech Rep.	Estonia	Georgia	Hungary	Latvia	Lithuania	Macedonia	Moldova	Poland	Romania	Russia	Slovak Rep.	Slovenia
GDP	-0.020 (0.029)	-0.088*** (0.013)	0.013*** (0.003)	-0.033*** (0.006)	0.004* (0.002)	0.032*** (0.003)	-0.045*** (0.011)	-0.017*** (0.003)	0.017*** (0.004)	0.037*** (0.003)	-0.003 (0.013)	-0.007 (0.014)	-0.026*** (0.002)	-0.011** (0.005)	-0.005** (0.002)	-0.018*** (0.004)	-0.006* (0.003)
GDP per capita	-0.026 (0.063)	0.069*** (0.022)	0.000 (0.006)	-0.011 (0.011)	-0.005 (0.004)	-0.022** (0.009)	-0.012 (0.025)	0.033*** (0.005)	0.026** (0.012)	0.015* (0.008)	0.001 (0.019)	0.061** (0.030)	0.029*** (0.005)	0.028*** (0.007)	-0.012*** (0.004)	0.019*** (0.007)	0.012** (0.006)
Economic risk	-0.099 (0.279)	-0.095 (0.135)	-0.245*** (0.030)	-0.462*** (0.069)	-0.000 (0.018)	-0.406*** (0.048)	-0.295** (0.136)	-0.117*** (0.026)	-0.492*** (0.069)	-0.512*** (0.052)	-0.673*** (0.080)	-0.714*** (0.081)	-0.002 (0.030)	-0.352*** (0.032)	0.032* (0.019)	-0.107*** (0.035)	-0.108*** (0.031)
Political risk	0.252 (0.384)	-0.312* (0.172)	0.068 (0.043)	0.351*** (0.073)	-0.042 (0.026)	0.301*** (0.062)	0.523*** (0.198)	-0.036 (0.039)	0.096 (0.093)	0.208*** (0.061)	0.484*** (0.133)	0.074 (0.143)	-0.188*** (0.039)	0.222*** (0.044)	0.115*** (0.026)	0.057 (0.046)	0.099** (0.042)
Common official language												-0.730*** (0.079)		-0.302*** (0.027)	-0.372*** (0.018)		
Common ethnic language		-0.010 (0.099)	0.112*** (0.020)					-0.307*** (0.022)				-0.133*** (0.036)	0.393*** (0.060)		-0.014 (0.016)		-0.095*** (0.021)
Distance	0.091* (0.050)	0.048 (0.035)	-0.040*** (0.007)	0.070*** (0.011)	0.039*** (0.004)	0.115*** (0.006)	0.076*** (0.027)	0.023*** (0.006)	-0.009 (0.009)	0.021*** (0.006)	-0.005 (0.020)	-0.031 (0.022)	0.123*** (0.005)	-0.017* (0.009)	-0.063*** (0.006)	0.008 (0.007)	0.063*** (0.007)
Contiguity	0.139** (0.063)	0.259*** (0.080)	-0.200*** (0.014)	-0.221*** (0.024)	-0.343*** (0.011)	-0.139*** (0.017)	0.250*** (0.071)	-0.159*** (0.013)	-0.354*** (0.023)	-0.210*** (0.018)	0.014 (0.038)	0.170*** (0.055)	-0.192*** (0.011)	-0.127*** (0.017)	-0.041*** (0.008)	-0.114*** (0.012)	-0.112*** (0.012)
Same country				0.026 (0.023)	-0.087*** (0.014)		-0.528*** (0.073)	-0.081*** (0.013)		0.175*** (0.021)	0.073 (0.048)		-0.063*** (0.020)			-0.089*** (0.012)	-0.068*** (0.013)
Colony	0.301** (0.139)	-0.110 (0.114)	0.020 (0.030)	-0.047* (0.026)	0.394*** (0.020)	-0.033** (0.015)	-0.029 (0.107)	0.326*** (0.025)	0.316*** (0.037)	0.005 (0.033)	0.089 (0.066)	0.525*** (0.082)	0.002 (0.020)		-0.208*** (0.011)	0.071*** (0.026)	0.157*** (0.017)
Initial exports	-0.052*** (0.009)	-0.058*** (0.006)	-0.079*** (0.002)	-0.079*** (0.002)	-0.068*** (0.001)	-0.074*** (0.002)	-0.079*** (0.005)	-0.085*** (0.002)	-0.077*** (0.002)	-0.069*** (0.002)	-0.054*** (0.003)	-0.060*** (0.004)	-0.094*** (0.001)	-0.055*** (0.002)	-0.058*** (0.001)	-0.067*** (0.001)	-0.068*** (0.001)
Number of products	-0.214*** (0.028)	-0.294*** (0.020)	-0.281*** (0.006)	-0.244*** (0.010)	-0.356*** (0.005)	-0.209*** (0.005)	-0.192*** (0.018)	-0.233*** (0.007)	-0.253*** (0.007)	-0.257*** (0.005)	-0.262*** (0.016)	-0.231*** (0.014)	-0.237*** (0.004)	-0.308*** (0.009)	-0.286*** (0.005)	-0.269*** (0.006)	-0.245*** (0.007)
Number of countries	-0.532*** (0.040)	-0.403*** (0.021)	-0.359*** (0.005)	-0.467*** (0.009)	-0.509*** (0.004)	-0.402*** (0.007)	-0.367*** (0.021)	-0.475*** (0.005)	-0.462*** (0.008)	-0.448*** (0.006)	-0.395*** (0.013)	-0.385*** (0.017)	-0.449*** (0.004)	-0.385*** (0.006)	-0.389*** (0.004)	-0.450*** (0.006)	-0.469*** (0.006)
Unit values coefficient of variation	0.023* (0.012)	0.000 (0.012)	-0.005 (0.004)	0.002 (0.003)	0.017*** (0.003)	-0.005 (0.003)	-0.025*** (0.010)	0.007*** (0.002)	0.036*** (0.004)	0.047*** (0.004)	-0.015*** (0.005)	-0.006 (0.005)	0.005*** (0.002)	-0.008** (0.004)	0.033*** (0.003)	0.012*** (0.003)	-0.013*** (0.003)
Reference priced goods	0.044 (0.054)	-0.102** (0.049)	0.024** (0.009)	-0.029** (0.013)	-0.046*** (0.006)	0.007 (0.009)	0.048 (0.031)	0.002 (0.008)	-0.028** (0.013)	-0.016 (0.010)	-0.031* (0.018)	0.020 (0.025)	0.035*** (0.007)	0.037*** (0.009)	-0.022*** (0.007)	0.034*** (0.009)	-0.031*** (0.008)
Homogeneous goods	0.062 (0.107)	-0.290*** (0.069)	-0.057*** (0.021)	-0.122*** (0.034)	-0.038*** (0.015)	0.036** (0.017)	0.108** (0.050)	0.069*** (0.018)	-0.053* (0.028)	-0.076*** (0.022)	0.057 (0.037)	-0.033 (0.043)	0.040** (0.016)	-0.016 (0.023)	-0.076*** (0.017)	0.010 (0.022)	-0.038* (0.022)
Constant	1.418 (1.650)	5.427*** (0.841)	3.405*** (0.185)	3.395*** (0.336)	3.797*** (0.108)	1.003*** (0.279)	1.350* (0.806)	3.577*** (0.164)	3.385*** (0.430)	2.460*** (0.278)	2.714*** (0.618)	4.040*** (0.652)	3.126*** (0.169)	3.445*** (0.175)	3.308*** (0.121)	3.279*** (0.211)	2.364*** (0.181)
Observations	4,602	9,900	149,498	87,939	416,653	126,871	10,340	227,530	78,840	148,206	31,494	20,013	319,480	152,011	278,806	184,932	195,293
No. Relationships	2,245	5,292	54,157	31,209	110,241	40,826	5,446	65,026	28,706	45,922	12,135	7,799	98,240	51,317	87,070	55,179	55,054
Log-Likelihood	-2,632	-5,601	-82,821	-47,430	-207,107	-69,816	-5,926	-121,748	-41,135	-77,859	-17,761	-10,973	-125,709	-81,720	-156,262	-97,651	-100,381
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

All continuous variables in logs

Parameter estimates (std. error) with \*, \*\*, \*\*\* denoting significance at 10%, 5%, and 1%.

Robust standard errors in parentheses

Table 4 - Estimates of reference product dummy

	Entire period	1996-1998	2000-2002	2004-2006
All countries	0.009*** (0.003)	0.024*** (0.005)	0.007 (0.005)	-0.035*** (0.006)
Albania	0.044 (0.054)	0.110 (0.086)	0.241** (0.111)	-0.148 (0.101)
Azerbaijan	-0.102** (0.049)	-0.326*** (0.102)	-0.071 (0.081)	0.012 (0.112)
Bulgaria	0.024** (0.009)	0.056*** (0.014)	0.005 (0.022)	-0.030 (0.020)
Croatia	-0.029** (0.013)	-0.038 (0.026)	0.008 (0.026)	-0.094*** (0.035)
Czech Rep	-0.046*** (0.006)	-0.038*** (0.011)	-0.059*** (0.012)	-0.115*** (0.019)
Estonia	0.007 (0.009)	0.022 (0.018)	-0.063*** (0.016)	-0.051* (0.030)
Georgia	0.048 (0.031)	0.176** (0.069)	-0.087 (0.068)	0.080 (0.053)
Hungary	0.002 (0.008)	0.000 (0.012)	-0.027 (0.018)	-0.004 (0.025)
Latvia	-0.028** (0.013)	0.012 (0.025)	0.038 (0.030)	-0.074*** (0.024)
Lithuania	-0.016 (0.010)	0.006 (0.018)	0.015 (0.019)	-0.163*** (0.024)
Macedonia	-0.031* (0.018)	-0.062* (0.032)	0.002 (0.041)	-0.002 (0.046)
Moldova	0.020 (0.025)	-0.061 (0.055)	0.012 (0.063)	0.043 (0.060)
Poland	0.035*** (0.007)	0.029* (0.016)	0.043** (0.020)	-0.027*** (0.010)
Romania	0.037*** (0.009)	0.033** (0.017)	0.006 (0.021)	0.029 (0.021)
Russia	-0.022*** (0.007)	-0.027*** (0.010)	-0.029** (0.013)	-0.125*** (0.022)
Slovak Rep	0.034*** (0.009)	0.033** (0.015)	0.032* (0.018)	0.018 (0.025)
Slovenia	-0.031*** (0.008)	-0.003 (0.015)	-0.063*** (0.018)	-0.102*** (0.024)

Parameter estimates (std. error) with \*, \*\*, \*\*\* denoting significance at 10%, 5%, and 1%.  
Robust standard errors in parentheses



Table 5- Estimates of homogeneous goods dummy

	Entire period	1996-1998	2000-2002	2004-2006
All countries	-0.002 (0.006)	0.062*** (0.012)	-0.019 (0.012)	-0.083*** (0.012)
Albania	0.062 (0.107)	0.136 (0.146)	0.389* (0.203)	-0.278 (0.234)
Azerbaijan	-0.290*** (0.069)	-0.339*** (0.125)	-0.635*** (0.153)	-0.092 (0.205)
Bulgaria	-0.057*** (0.021)	0.042 (0.032)	-0.028 (0.048)	-0.212*** (0.039)
Croatia	-0.122*** (0.034)	-0.094 (0.068)	-0.196*** (0.060)	-0.108 (0.097)
Czech Rep	-0.038*** (0.015)	-0.007 (0.026)	-0.073*** (0.028)	-0.101** (0.045)
Estonia	0.036** (0.017)	0.038 (0.037)	-0.035 (0.025)	0.120* (0.061)
Georgia	0.108** (0.050)	0.211** (0.095)	-0.105 (0.129)	0.180** (0.086)
Hungary	0.069*** (0.018)	0.203*** (0.031)	-0.035 (0.047)	0.095 (0.059)
Latvia	-0.053* (0.028)	0.002 (0.061)	-0.121** (0.059)	-0.108** (0.047)
Lithuania	-0.076*** (0.022)	0.114*** (0.041)	-0.145*** (0.052)	-0.274*** (0.042)
Macedonia	0.057 (0.037)	0.125** (0.063)	-0.043 (0.076)	0.089 (0.094)
Moldova	-0.033 (0.043)	-0.177* (0.099)	0.043 (0.115)	0.017 (0.108)
Poland	0.040** (0.016)	0.191*** (0.037)	0.067 (0.051)	-0.094*** (0.021)
Romania	-0.016 (0.023)	-0.054 (0.040)	0.061 (0.055)	0.061 (0.050)
Russia	-0.076*** (0.017)	-0.088*** (0.025)	-0.101*** (0.034)	-0.050 (0.050)
Slovak Rep	0.010 (0.022)	-0.017 (0.039)	-0.006 (0.048)	-0.044 (0.055)
Slovenia	-0.038* (0.022)	-0.074* (0.042)	-0.074 (0.045)	-0.084 (0.055)

Parameter estimates (std. error) with \*, \*\*, \*\*\* denoting significance at 10%, 5%, and 1%.  
Robust standard errors in parentheses

# Figure 1 – Effect of selected variables on the hazard

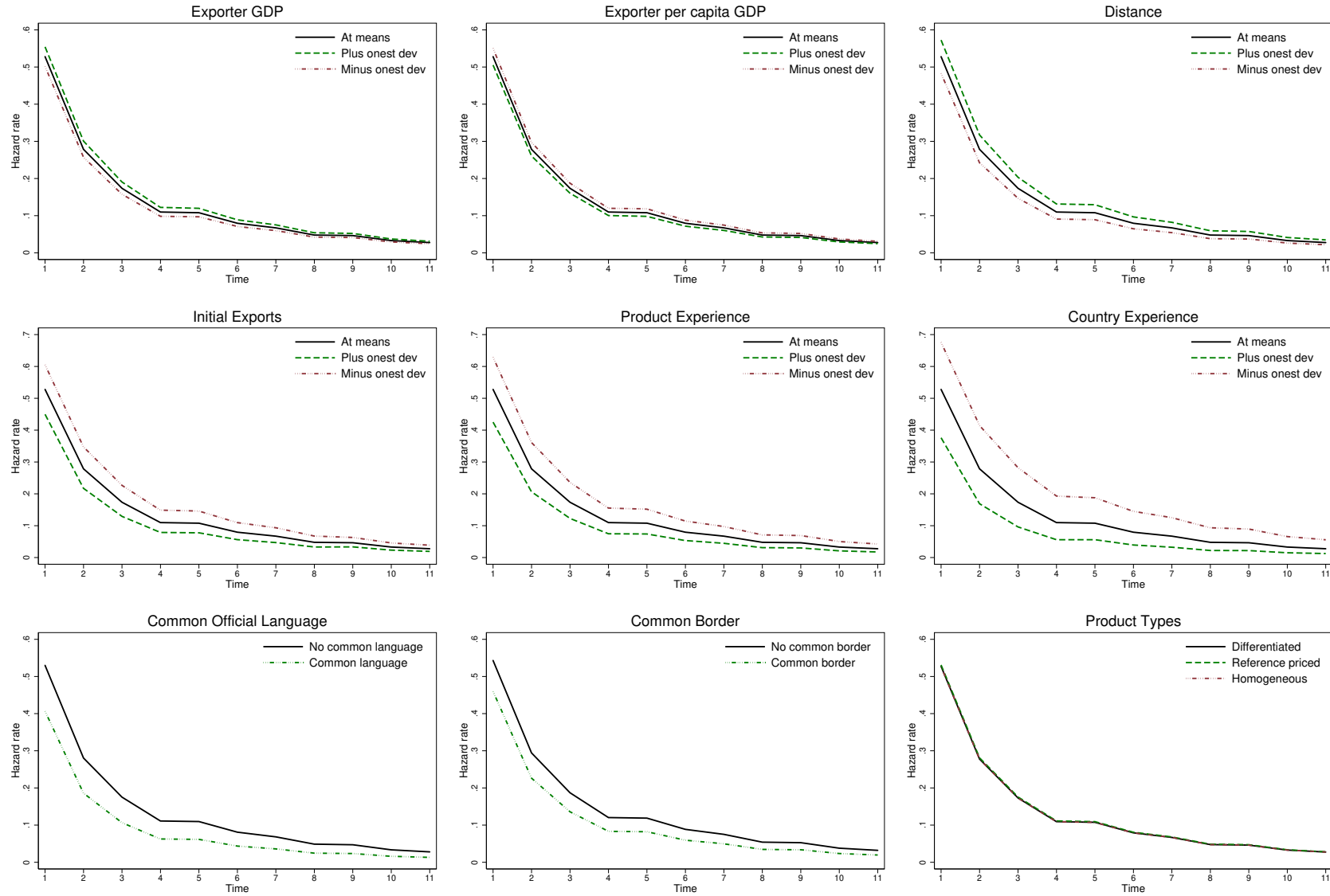


Figure 2 – Estimated hazard for product types for four countries

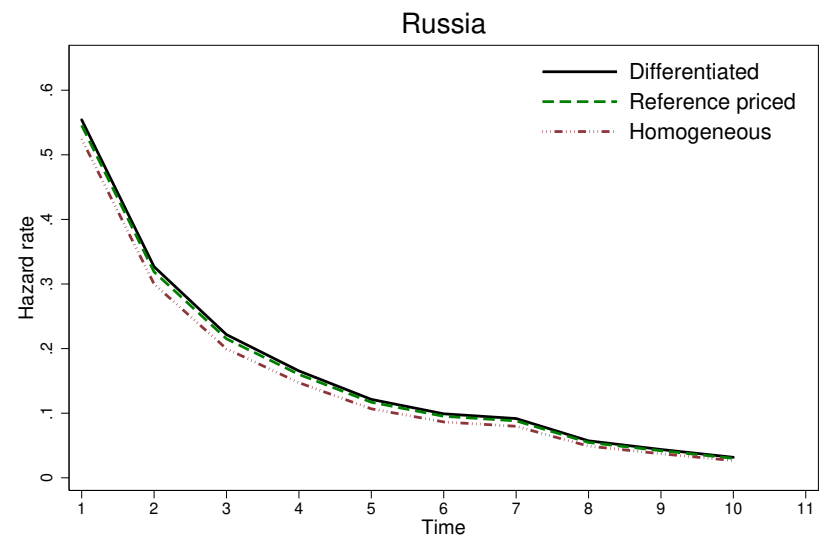
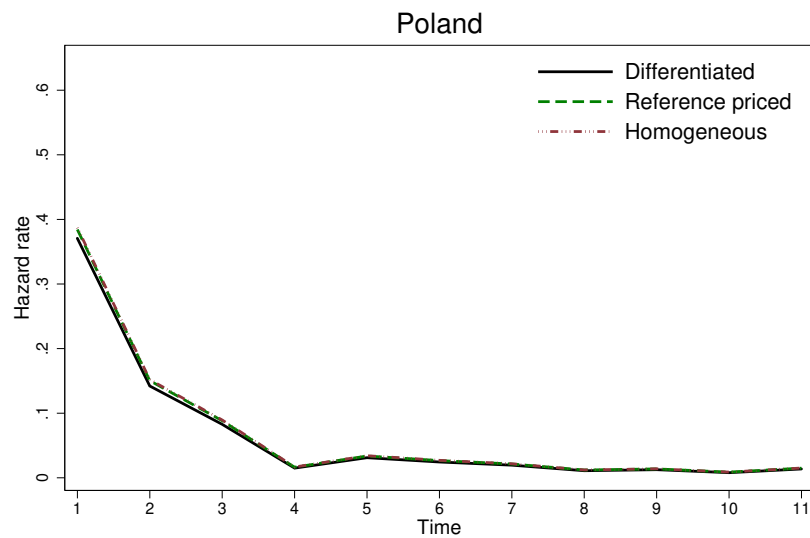
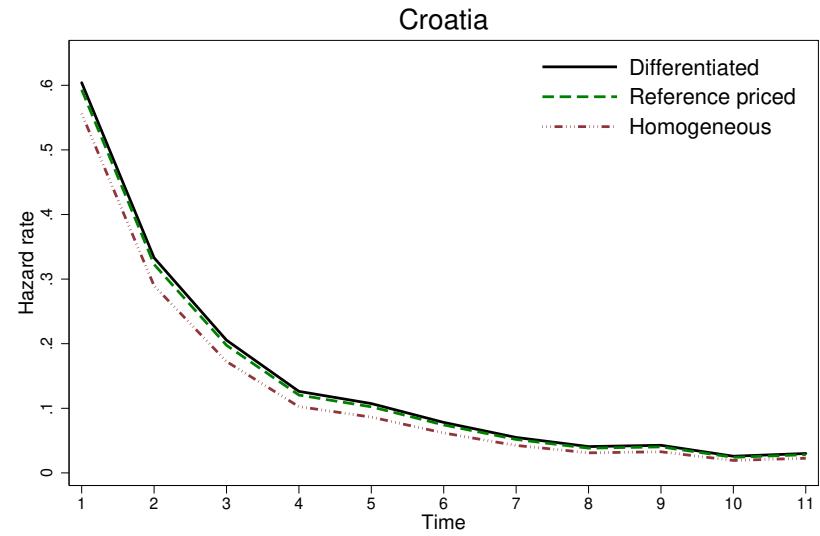
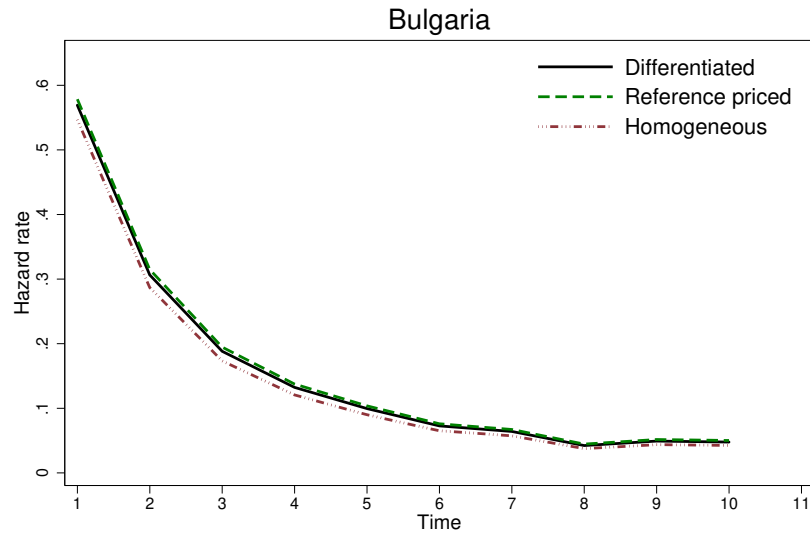


Figure 3 – Estimated hazard for product types across time

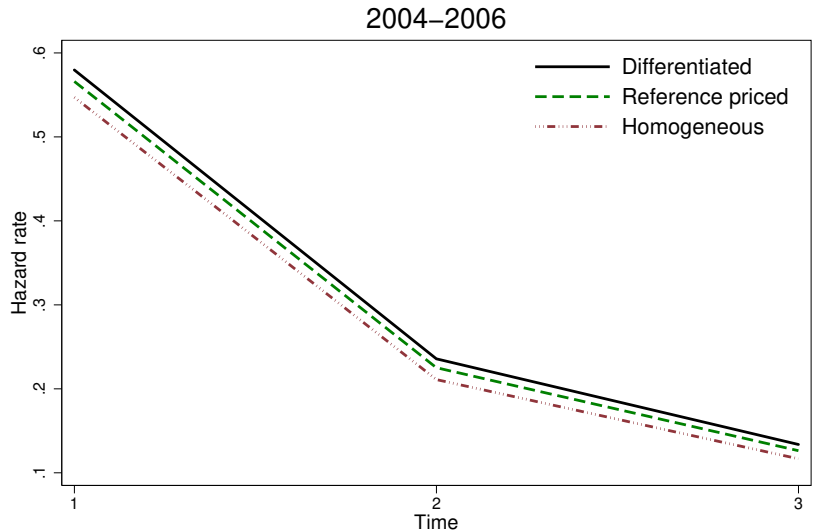
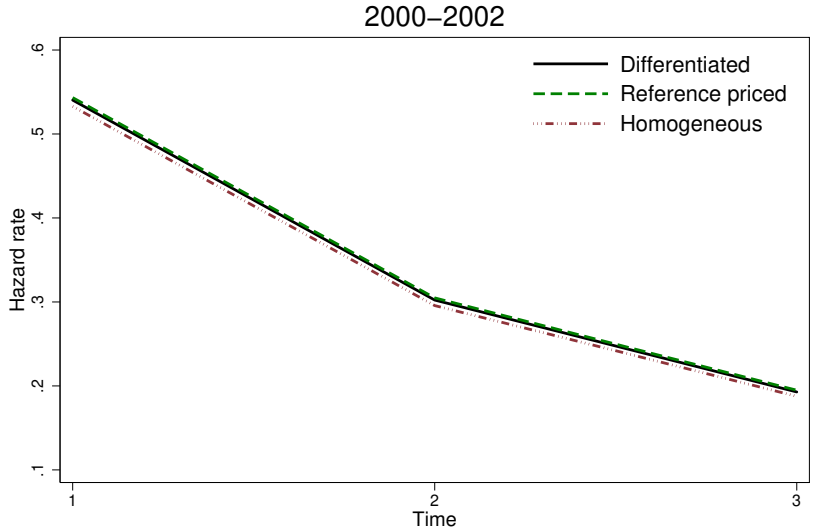
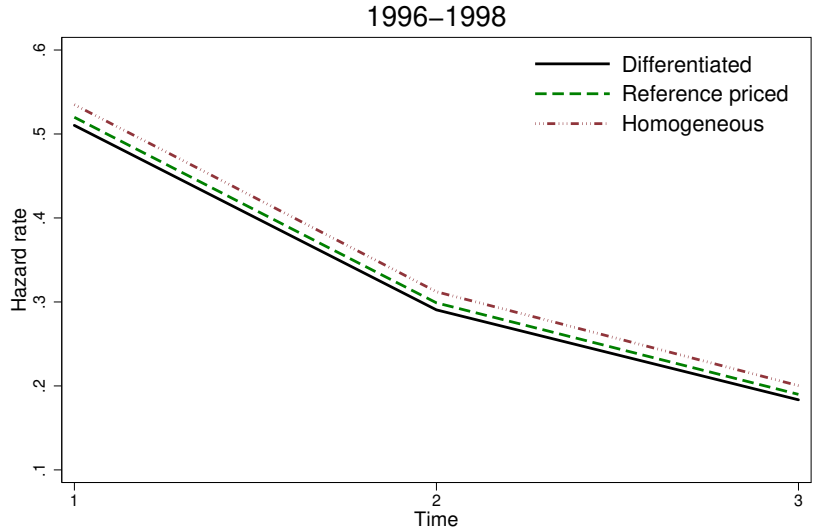


Figure 4 – Estimated hazard for product types across time for select countries

