

# The impact of market potential and competition on regional enterprise creation? Evidence from the fall of the Iron Curtain.

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## Abstract

We use the large and unforeseen shock of the fall of the Iron Curtain to identify the impact of changes in market access and competition on new enterprise formation in the retail trade markets of the Austrian and Czech border region. The results show a substantial impact on new enterprise creation among private-sector retailers in the Czech Republic. A one standard deviation increase in the market potential located in Austria increased the number of retailers per 100 inhabitants by 2.91 in the Czech border municipalities by 1997. A one standard deviation increase in our measure of competition reduced market entry by 2.85 enterprises per 100 inhabitants. By contrast, we find little evidence of strong adverse effects on creating new retail enterprises in the Austrian border municipalities.

**Keywords:** market size, retail trade, new enterprises.

**JEL:** R32, M13, R12.

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# 1 Introduction & Motivation

When in December 1989, after the fall of the Iron Curtain, the borders between Austria and the Czech Republic opened for cross-border travel, this also implied an overnight liberalisation for cross-border shopping. In particular, for Austrian consumers, cross-border shopping, which was virtually impossible in communist times, became an attractive option. Consequently, also market access of Czech retailers in the border region to Austria increased substantially. Standard models of market entry (see Bresnahan and Reiss, 1991) and spatial competition (Salop, 1979; Krugman, 1992) predict that this improved market access should lead to increased incentives to found new enterprises and that these incentives should be larger in regions further away from potential competitors.

This paper uses the large and unforeseen change in market access and competition at the Austrian-Czech border resulting from the fall of the Iron Curtain to test these predictions. The case we study is marked by an almost 40-year-long complete separation of Austria and the Czech Republic by the Iron Curtain prior to the liberalisation, large income and price differences between the countries and an almost complete lack of private enterprises in communist times. This greatly facilitates the identification of the impact of market size and competition on enterprise entry. On the one hand, due to the long and severe separation of the two countries, their border regions developed largely independently of each other prior to the changes. This substantially reduces concerns about the endogeneity of market size resulting from the interdependence of enterprises' and residents' location decisions. On the other hand, since in communist times, private enterprises did not exist in the Czech Republic, we consider a case where private enterprises are created "from scratch" in an environment where huge price differentials made cross-border shopping very attractive for Austrian consumers.

We data on the number establishment in retail trade and the population at a municipality level and focus on retail trade because this sector is marked by a limited market radius and because studies conducted at the time of liberalisation (see Kratena and Wüger, 1997) suggest that the vast majority of cross-border purchases occurred in retail trade. According to the results, the market access located in Austria contributed substantially to the creation of private-

sector retailers in the Czech Republic. Our most conservative estimates indicate that a one standard deviation increase in the market potential located in Austria in 1991 increased the number of retailers per 100 inhabitant by 2.91 in the Czech border municipalities by 1997. Also market entry was noticeably lower in municipalities, where, given market access, competition from Austrian producers was more intense. A standard deviation increase in our competition measure reduced market entry by 2.85 establishments per 100 inhabitants. We also find that while foreign market access and competition were initially statistically insignificant determinants for the founding of new establishments, they very rapidly turned statistically significant and reached stable levels by 1995. Further, next to retail trade, the development of private establishments in the gastronomy and personal services sector also profited, although to a lesser degree, from the opening of borders. By contrast, for the construction sector, where liberalisation was less complete, no similar effects can be found. Finally, since the Austrian public debate after the fall of the Iron Curtain voiced substantial concern over the potential adverse effects of increased competition from the Czech Republic on Austrian producers, we conduct a parallel analysis for Austria. Although our results are less conclusive in this case, we find no compelling evidence of adverse effects.

These results are of relevance to a number of strands of the economic literature. One of these is the empirical literature on spatial competition (see e.g. Chatterjee, 2023; Loy et al., 2022; Thome and Li Lawell, 2022) and market entry. This has mostly used detailed industry and price data and structural model estimation to test the hypotheses stated in this paper (or corollaries thereof) in mature market economies. Some of these contributions have also focused on the spatial impact of competition in retailing (e.g. Ellickson and Grieco, 2013) and on the impact of market size on entrepreneurship (e.g. Sato, Tabuchi, and Yamamoto, 2012). Only few studies (see: Roberts and Thompson, 2003; Iwasaki, Maurel, and Meunier, 2016; Lábaj et al., 2018, for exceptions), however, consider market entry in transition economies and to the best of our knowledge, we are the first to analyse this issue in a cross-border context.

Our results are also relevant for the literature on cross-border shopping. In this, recent contributions (e.g. Asplund, Friberg, and Wilander, 2007; Friberg, Steen, and Ulsaker, 2022) use the external variation in tax policies of a country or exchange rate fluctuations to identify the

effects of exogenous changes in the competitive environment on cross-border shopping. These results, therefore, pertain to the intensive margin of cross-border shopping. By contrast, the case we consider concerns the extensive margin, as cross-border shopping was impossible due to the tight border controls prior to reforms. To the best of our knowledge, our paper is the first to provide empirical evidence on such a case.

Finally, our results add to the by now sizeable economic geography and economic history literature (see e.g. Redding and Sturm, 2008; Ahlfeldt et al., 2015; Brühlhart, Carrère, and Robert-Nicoud, 2018; Yang, Partridge, and Chen, 2022; Coufalova et al., 2024) using border regime changes, including the fall of the Iron Curtain, to identify the impact of market access on the development of border regions. While these contributions address the impact of such changes on the overall economy, our focus is on the impact of liberalisation of cross-border shopping on the development of retail trade. In this respect, our work is most closely related to the previous contributions of Eberhard-Ruiz and Moradi (2019) and Heider (2019), who find that the impact of trade liberalisation is more pronounced in local small-scale trade and in the service sector than in manufacturing and to Peters (2022), who shows that an exogenous increase in market size caused by refugees inflows had large and persistent effects on income per capita.

The next section of the paper provides the historical background to our study, while sections 3 and 4 introduce the method and data used, respectively. Section 5 presents results, section 6 discusses some robustness issues, and section 7 concludes.

## **2 Historic Background**

From the communist coup d'état in 1948 to 1989 the Czech Republic was part of the former Communist Block, while Austria belonged to the Western Countries. The border between the two countries was, therefore, part of the Iron Curtain. Migration across this border was severely limited, and emigration from the Czech Republic was forbidden and deterred by the fortification of the border. International trade in goods and services was also heavily regulated and under central state control in the planned economy of the Czech Republic. Cross-border travel

and cross-border shopping were additionally discouraged by visa and high mandatory minimum currency exchange requirements. Therefore, in the almost 40-year period of the Iron Curtain, the border regions of these two countries essentially developed independently of each other. In addition, on the Czech side of the border under communist rule, private ownership of establishments was heavily restricted. Consequently, private establishments were virtually non-existent until 1989 (see Dyba and Svejnar, 1994).

While there were repeated instances of opposition against the communist dictatorship throughout the 1960's and 1970's any attempts at political changes were prevented by the strong influence of the Soviet Union on the Czech Republic. Over the 1980s, however, this influence slowly waned, and on November 17<sup>th</sup>, 1989, a brutally suppressed student demonstration in Prague marked the beginning of what was later called the Velvet Revolution. These mass protests led to the resignation of the communist Politburo on November 28<sup>th</sup>, 1989, and after some initial disagreements over potential reform paths, the new transitional government set its primary goals in transforming Czechoslovakia into a democratic market economy, with private sector development as one of its central goals. On December 17<sup>th</sup>, 1989, this new government abolished all pre-existing restrictions on cross-border travel. A side effect of this was that also cross-border shopping between two countries was de facto liberalized over night. While from a legal point of view, quota for the import of goods from abroad in Austria remained in place<sup>1</sup> their control was lax and sanctions for (petty) smugglers were mild. Also, import controls could not be implemented for certain services, where consumption occurs at the place of the service provider (e.g. gastronomy, massage parlours, hairdressers and similar services).

This was combined with huge price and income differentials between the two countries. According to Dyba and Svejnar (1994), the Czechoslovak GNP per capita at official exchange rates was only a quarter of that of Austria in 1991. In addition, in 1990, the Czech provisional government devalued the Crown and pegged it to a basket of hard currencies,<sup>2</sup> Exchange rates were thus extremely favourable for Czech producers, and prices for consumer goods in the Czech Republic

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<sup>1</sup>Tourists could legally import goods in the value of 500 Czech Crowns and 1 carton of cigarettes as well as 2 litres of wine and 1 litre of spirits to Austria according to contemporary travel guides (see Petro and Werner, 1993)

<sup>2</sup>This originally included the US Dollar, German Mark, Austrian Schilling as well as the Swiss and French Franc, but was reduced to the German Mark and the US Dollar after the separation of Czechoslovakia in 1993. Originally, the currency was allowed to fluctuate by  $\pm 0.5\%$ , after 1996, this was increased to  $\pm 7.5\%$ . In 1997, the fixed exchange rate system was replaced by floating exchange rates.

were substantially lower than in Austria. The earliest price data available from EUROSTAT for the Czech Republic<sup>3</sup> indicates that in average Czech prices were only 30% of those in Austria in 1995. Unsurprisingly, therefore incentives for cross-border shopping increased during liberalisation. Kratena and Wüger (1997) estimate that Austrians spent 0,5 billion Schillings (approx. 36,7 Million Euro in the Czech Republic in 1990, and by 1991, this had doubled to 1 billion Schillings (approx. 73 Million Euro). This sum was small in comparison to the overall Austrian economy. Its strong concentration on the border regions and on only a few commodities, however, meant that purchasing power outflows could reach 10% of turnover in specific markets of some regions (see Kratena and Wüger, 1997, p. 53).

Next to the liberalisation of cross-border travel, a further aspect of the provisional governments' (as well as all subsequent governments') market-oriented reform program was rapid private sector development (see: Svejnar, 2002). This implied, on the one hand, that restrictions on the founding of new enterprises were rapidly abandoned and that, in addition, existing state-owned enterprises (SOEs) were subjected to privatisation. This privatisation took several forms, which included restitution, small-scale privatisation of mostly small shops and service units, and large-scale privatisation that involved around 2,000—mostly industrial—Czech SOEs. In our context, in particular restitution and small-scale privatisation and the reduction of restrictions on the founding of (new) private enterprises, which were initiated in 1990<sup>4</sup> are particularly relevant because they predominated among retailers.

### 3 Theory and Method

Economic theory suggests that the creation of private enterprises either through privatisation or through the creation of new enterprises was facilitated by the additional demand resulting from cross-border shopping. To see this, consider a monopolistic (Cournot) competition model (see Dixit and Stiglitz, 1977). In this, consumers spend a fixed proportion of their income on products, that are all produced in differentiated varieties, with the demand for each variety

<sup>3</sup>see [https://ec.europa.eu/eurostat/databrowser/view/prc\\_ppp\\_ind\\_\\_custom\\_11745833/default/table?lang=de](https://ec.europa.eu/eurostat/databrowser/view/prc_ppp_ind__custom_11745833/default/table?lang=de) (accessed on June 12, 2024)

<sup>4</sup>The central legal document by which this was achieved was the Act on Private Enterprise, enacted in April 1990 (Act No. 105/1990). A new commercial code went into effect in 1992.

following a constant elasticity of substitution demand function. Enterprises each produce a separate variety of the differentiated product, according to a linear cost function that includes fixed (or sunk) costs. In consequence, given the market demand function for their varieties, enterprises set prices (and consequently quantities) as a markup over their marginal costs that is decreasing in the price elasticity of demand. Further, they enter the market as long as expected profits are positive.

As shown by Bresnahan and Reiss (1991) in the equilibrium of such a model the number of enterprises operating (respectively the number of varieties produced) in a market is solely determined by market size (or the total expenditure on the product) in a location relative to fixed costs. In addition, general equilibrium spatial competition versions of such models (e.g Krugman, 1992) show that there are also incentives to locate at a distance from potential competitors, as this increases their price setting autonomy (and thus prices). Nonetheless, enterprises may choose to locate near each other if the benefits of technological externalities outweigh the costs of reduced price-setting autonomy or in an out-of-equilibrium situation where the number of enterprises in a location still allows for further profitable entry.

One way to test these hypotheses would be a difference in difference set-up, where the pre-reform differences in outcomes between treated and untreated units are compared to their post-treatment differences. This route is not open to us because private enterprises did not exist prior to market-oriented reforms in the Czech Republic. In our empirical model, we rely on the exogenous nature of the to market access and competition combined the inclusion of control variables to identify effects. Our central dependent variable is the change in the number of enterprises per 100 inhabitants (denoted by  $\Delta N_{i(t/1991)}^T$ ) from the beginning of reforms (in 1991) to year  $t$  (which will be 1997 in our baseline estimates), in municipality  $i$ . This is regressed on measures of foreign market access ( $FMA_{i1991}$  with the subscript 1991 highlighting that all variables are measured in 1991) and the extent of competition from abroad ( $FC_{i1991}$ ). In addition, we control for domestic market access ( $DMA_{i1991}$ ) and domestic competition ( $DC_{i1991}$ ) as well as further variables ( $X_{i1991}$ ) that may be correlated to market entry. Consequently, in our baseline analysis, we estimate cross-sectional equations of the form:

$$N_{i(t/1991)}^T = \delta_1 DMA_{i1991} + \delta_2 DC_{i1991} + \gamma_1 FMA_{i1991} + \gamma_2 FC_{i1991} + \lambda_3 X_{i1991} + \epsilon_{it} \quad (1)$$

In this equation,  $\delta_1$ ,  $\delta_2$ ,  $\gamma_1$  and  $\gamma_2$  as well as the vector  $\lambda$  contain the parameters to be estimated. Among these,  $\gamma_1$  and  $\gamma_2$  are of central interest, as they provide an estimate of the impact of the foreign market access as well as foreign competition on the number of newly founded enterprises per 100 inhabitants in a municipality. For these estimates to have a causal interpretation the conditional independence assumption must hold: Next to the exogeneity of the treatment discussed in the last section, this requires that the vector of control variables ( $FMA_{i1991}$ ,  $FC_{i1991}$  and  $X_{i1991}$ ) includes all other explanatory variables that are potentially correlated with foreign market access. If causal variables that are positively correlated to market access are omitted this will imply an overestimation of the true parameter. By contrast, if variables negatively correlated to market access are not included, this will underestimate the true impact of foreign market access.

## 4 Data

### 4.1 Sources and Variable Definition

We use municipality-level data from the official enterprise registry of both countries to estimate the equation (1). The Austrian data is taken from the Gewerbeinformationssystem (GISA) of the Austrian Ministry for the Economy and Labor<sup>5</sup> and the Czech data from the register of economic subjects of the Czech Republic provided by the Czech statistical office<sup>6</sup>. Both data sets pertain to the years 1980 to 2010 and contain the date of first registration of a enterprise, an industry and municipality code and (if applicable) the date of de-registration. Since the focus of the current paper is on cross-border shopping, we primarily focus on retail trade (i.e. NACE 2008 (Rev. 2) groups 45 and 47)<sup>7</sup>, because Austrian consumers spent the vast majority of their

<sup>5</sup>see [https://www.bmaw.gv.at/Themen/Unternehmen/GISA\\_Gewerbeinformationssystem/GISA\\_Abfragen.html](https://www.bmaw.gv.at/Themen/Unternehmen/GISA_Gewerbeinformationssystem/GISA_Abfragen.html).

<sup>6</sup>see <https://www.bios.cz/en/czech-statistic-office/statistical-register-of-economic-subjects/>.

<sup>7</sup>The industry identifier differs between data sets. In Austria, it follows a national classification system reflecting the necessities of the Austrian system of enterprise permits. In the Czech Republic, it is based on the national



money on commodities sold by retailers when shopping abroad according to Kratena and Wüger (1997).<sup>8</sup> For enterprises belonging to this sector, we use the date of first registration and (where relevant) of de-registration to count the number of active enterprises in a municipality on the 1<sup>st</sup> of January of each year.

We augment this data with municipality-level population census data provided by Statistics Austria and the Czech Statistical Office<sup>9</sup>. Since both countries conducted a census in 1991 we use these data to calculate change in the number of enterprises per 100 inhabitants relative to 1991 as our dependent variable. We also use these data to define some control variables (i.e.  $X_{i1991}$ ). These include measures of the human capital (share of the population with a secondary and tertiary education) and the age structure (share of population under 15, and 65 or older)<sup>10</sup> and the population density of a municipality in 1991 as these variables have been identified to be important regional determinants of enterprise formation in previous research (see: Fritsch and Storey, 2014, for a survey). This data is, also used to calculate both our measures of foreign and domestic market access. For this, we geocode all municipality-level data using the reference points defined by the respective statistical offices<sup>11</sup> and use these to calculate the road distance between all municipality centres and to the nearest Austrian-Czech border crossing.<sup>12</sup> Following the literature (e.g Head and Mayer, 2000; Hanson, 2005; Brühlhart, Carrère, and Robert-Nicoud, 2018) we measure market access through distance-weighted population using the standard inverse decay function. In our baseline estimates, this has a distance decay parameter of  $-1$ , but in robustness tests in section 6, we also experiment with other parametrisations.

Thus, domestic market access is calculated as  $DMA_{it} = \sum_{j \in D} P_j / d_{ij}$  with  $P_j$  the population in municipality  $j$ ,  $d_{ij}$  the distance from municipality  $i$  to  $j$  and  $D$  the set of all municipalities located in the same country as region  $i$ . Furthermore, we follow Head and Mayer (2000) in

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classification system (OKEC). For Austria, we, therefore, consider services that, according to the description of activities provided in the data, would be part of the NACE 2008 (Rev2) two-digit industry groups 45 (Wholesale and retail trade and repair of motor vehicles and motorcycles) and 47 (retail trade). For the Czech Republic, we use the comparable OKEC groups 50 (automobile trade and gasoline stations) and 521 to 526 (retail trade).

<sup>8</sup>According to Kratena and Wüger (1997) in 1991 17.8% of Austrian's expenditures abroad went to clothing, 16.1% to foodstuffs, 7.7% to fuels and 8% to tobacco.

<sup>9</sup>These are available at <https://www.statistik.at/datenbanken/statcube-statistische-datenbank>. for Austria and [www.czso.cz/csu/czso/databaze-demograficky-udaju-za-obce-cr](https://www.czso.cz/csu/czso/databaze-demograficky-udaju-za-obce-cr) for the Czech Republic.

<sup>10</sup>The base categories of people with at most compulsory education and the 15 to 64-year-old are omitted to avoid perfect co-linearity.

<sup>11</sup>see: <https://www.data.gv.at> for Austria and <https://geoportal.cuzk.cz/> for the Czech Republic.

<sup>12</sup>For these calculations we used open streetmaps from geofabric and grabhopper 7.0 to calculate distances.

measuring a municipality’s own market access based on the average distance of the points in a circle to the circle’s centre. We, therefore, set  $d_{ii} = (2/3)\sqrt{(A_i/\pi)}$  with  $A_i$  the area of a region. Analogously, we measure foreign market access  $FMA_{it} = \sum_{(j \in F)} P_j/d_{ij}$ , with  $F$  the set of municipalities in the other country than that of municipality  $i$ . In a similar fashion, we use the inverse distance decay function to construct our measure of spatial competition as a (spatially) weighted sum of the number of retailers operating in other municipalities. Thus domestic competition is measured as  $CD_{it} = \sum_{j \in D} N_j/d_{ij}$  with  $N_j$  the number of enterprises in municipality  $j$  and foreign competition is measured as  $CF_{it} = \sum_{j \in F} N_j/d_{ij}$ .

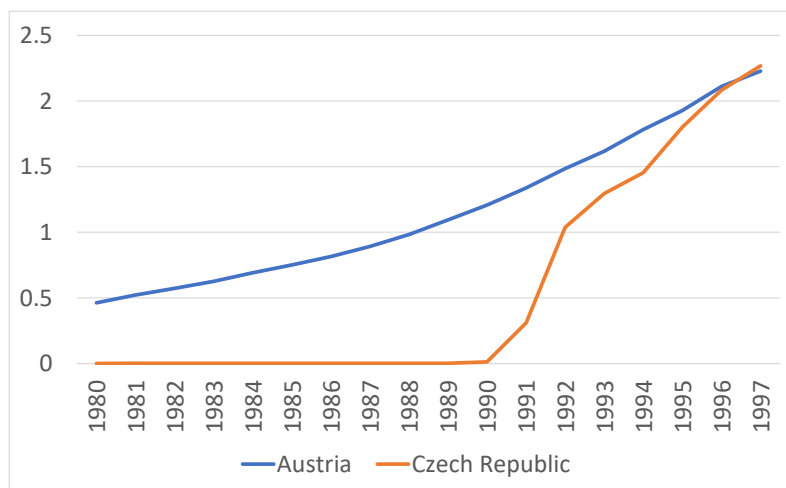
Finally, we augment our data with geographic variables. Next to distance to the Austrian-Czech border, these include the terrain roughness indicator, the area, the altitude and the geo-coordinates of each municipality. These indicators are taken from remotely sensed elevation data from Shuttle Radar Topography Mission (SRTM) 1 Arc-Second Global respectively the shape files provided by the statistical offices. Among these variables, we include distance to the border in all our regressions as a “catch all” variable for any omitted variables correlated with the distance to the border and the area to calculate the population density of a municipality in 1991 and its “own market access”. Furthermore, area, altitude, and the terrain roughness indicator also enter our analysis as further control variables in some specifications.

## 4.2 Descriptive Statistics

To avoid the impacts of exchange rate fluctuations in our estimates, we restrict our sample to the period when the Czech currency was pegged to the Dollar and German Mark (i.e. the years 1992 to 1997).<sup>13</sup> Furthermore, to exclude effects originating from the opening of borders to other Central and Eastern European countries in 1989 and Austria’s EU accession in 1995 on Austria, as well as effects from opening of border to Germany in 1989 and the separation of Czechoslovakia in 1992 on the Czech Republic, we limit our area of analysis to municipalities whose closest border is the Austrian-Czech border and that are located within 60 kilometers from this border. Figure 1 shows the development of the average number of retailers per 100

<sup>13</sup>The Austrian Schilling was pegged to the German Mark throughout the observation period. The exchange rate was 7 Schillings to a Mark.

Figure 1: Number of retail enterprises per 100 inhabitants located in the Czech and Austrian border Region 1980 to 1997



*Note:* Figure reports the average number of retail enterprises per 100 inhabitants across municipalities

*Source:* Austrian and Czech enterprise registry data, own calculations

inhabitants registered in the municipalities of analysis in the years 1980 to 1997. Both countries experienced a substantial increase in the number of retail enterprises registered in the border region over this period. The central difference is that while in the Austrian border region growth was rather smooth, in the Czech Republic, until the Fall of the Iron Curtain, only very few enterprises existed in the border region. After privatisation in 1990 and 1991, however, their number rose dramatically and by 1996 reached levels comparable to the Austrian border region.

Table 1 additionally provides descriptive statistics for the dependent and independent variables in our analysis. It highlights further differences and commonalities between the border regions of the two countries. Both regions were endowed with a very similar human capital structure in 1991, with 41% of the population in 1991 having completed secondary education, but only 2% possessing a tertiary degree. The population of the Czech border region was, however, slightly older, with about 20% of the population aged under 15 in both regions but 16% in the Czech border region and 14% in the Austrian border region aged 65 or older. Czech municipalities are also smaller and less densely populated. They cover an area of 12.9 km<sup>2</sup> and have a population

Table 1: Descriptive Statistics

	Czech Republic		Austria	
	Mean	Std. Dev	Mean	Std. Dev.
Enterprises per 100 inhabitants in 1997	2.267	1.817	2.228	1.082
Enterprises per 100 inhabitants in 1991	0.003	0.007	0.013	0.007
Change in enterprises per 100 inhabitants	1.958	1.790	0.890	0.528
Foreign market access	38.328	5.188	47.884	8.310
Foreign competition	223.243	31.510	2.955	0.387
Distance to border	42.502	20.417	42.407	25.584
Domestic market access	80.441	11.186	67.026	12.942
Domestic competitions	4.697	1.277	399.623	99.858
Share secondary educated	0.406	0.060	0.404	0.054
Share tertiary educated	0.022	0.015	0.021	0.012
Share population aged under 15	0.201	0.041	0.196	0.031
Share population aged 65+	0.160	0.055	0.143	0.034
Population density	68.023	133.143	107.020	179.765
Terrain roughness	2.242	0.895	2.332	1.189
Altitude	441.217	135.313	399.702	193.301
Area	12.966	16.072	33.328	23.372
Observations	1107		395	

*Note:* Table report statistics of the dependent and independent variables in the analysis for the border region in 1991

density of 63.4 inhabitants per km<sup>2</sup> on average. In Austria, municipalities cover 33 km<sup>2</sup> and host 107 inhabitants per km<sup>2</sup>. The main difference between the countries, however, was in the private sector development in 1991. While the increase in the number of retailers between 1991 and 1997 was about double that of Austria in the Czech Republic, the stock of retail enterprises per 100 inhabitants in 1991 was only half as high. Consequently, the measure of domestic competition in the Czech Republic is only about 1% of the Austrian level and the measure of foreign competition in the Austrian border region is only about 1% of the Czech level.

## 5 Results

### 5.1 Baseline Results

Table 2 presents the results of estimating four versions of the baseline specification in Equation 1. The first (in columns labelled (1)) only includes the variables of central interest (foreign market access and foreign competition) and control for distance to the border, as a “catch all”

variable for any missing variable correlated with distance to the border. The second specification (in columns labelled (2)) adds domestic competition and foreign market access as two central controls. The third (in columns labelled (3)) additionally includes demographic controls, and the fourth (in columns labelled (4)) also adds geographic characteristics.

For the Czech Republic results are rather similar across specifications. The estimates in specification (1), as the most conservative, indicate that a one standard deviation (5.2 units) increase in foreign market access statistically significantly increased the number of retailers by 2.91 enterprises per 100 inhabitants. The low explanatory power (as measured by the  $R^2$  value) of this estimate (of 2,1%) may, however, raise concerns with respect to missing variables. Yet, the subsequent specifications show that adding further controls increases rather than reduces the estimates. While improving their significance level to below 0.1% throughout, the estimates increase substantially when including domestic market access and competition as controls and reduce only slightly in specification (3), where the explanatory power is increased to 11.4%. Further, adding additional geographical controls once more increases the estimated coefficient, but contributes only little additional explanatory power. The same applies to the impact of foreign competition. Here, too, the most conservative estimate is that in specification (1). It suggests that a standard deviation (31.5 unit) increase reduced the number of enterprises by 2.85 enterprises per 100 inhabitants. Again this parameter is still larger in specification (3) and is significant at the 0.1% level in all specifications.

In addition, both domestic competition and market access were positively correlated with the development of the number of enterprises per 100 inhabitants in the Czech Republic. The former accords with theory. The latter, by contrast, suggests that either on account of agglomeration externalities or (more likely) on account of out-of-equilibrium dynamics, retailers preferred to enter markets in the vicinity of competitors in the period 1991 to 1997. This may be due to the still sub-optimally low number of enterprises in 1991. These results are also slightly less robust than foreign market access and competition. In particular, the coefficient on domestic market access almost halves, and reduces its significance level from 0.1% to only 5% as the number of controls increases across specifications.

Table 2: Baseline Estimation Results

	Czech Republic		Austria	
	(1)	(2)	(1)	(2)
Foreign market access	0.560** (0.1750)	0.833*** (0.2230)	0.693*** (0.1930)	0.860*** (0.2230)
Foreign competition distance	-0.0905*** (0.0261)	-0.129*** (0.0343)	-0.107*** (0.0291)	-0.138*** (0.0348)
Domestic market access	-0.0021 (0.0068)	-0.00669 (0.0066)	-0.00693 (0.0068)	-0.00762 (0.0070)
Domestic competitions		0.0319*** (0.0070)	0.0198** (0.0070)	0.0164* (0.0078)
Share secondary educated		0.298*** (0.0817)	0.243*** (0.0732)	0.217** (0.0749)
Share tertiary educated			2.155 (1.732)	1.876 (1.717)
Share population under 15			16.80*** (4.537)	15.99*** (4.794)
Share population aged 65+			-1.761 (2.381)	-1.788 (2.380)
Population density			-1.836 (1.944)	-1.814 (1.947)
Terrain roughness			-(0.000706) (0.0004)	-(0.000741) (0.0004)
Altitude			0.0309 (0.049)	0.0309 (0.049)
Area			-0.0013 (0.0007)	-0.0013 (0.0007)
			0.00214 (0.0035)	0.00214 (0.0035)
				-0.00907** (0.0077)
				-0.00953*** (0.0021)
				-0.00814*** (0.0021)
				-0.00401 (0.0085)
				-0.000434 (0.00416)
				-0.0011 (0.0011)
				0.131 (0.645)
				11.21*** (2.634)
				-2.972* (1.468)
				-2.953 (1.627)
				0.0000432 (0.0002)
				-0.0807*** (0.023)
				-0.000095 (0.0002)
				0.000792 (0.0009)
N	1107	1107	1107	1107
R-sq	0.021	0.088	0.113	0.116
			0.166	0.245
			0.114	0.268
			395	395

Note: Table displays regression results from estimating different versions of Equation (1). Values in brackets are (heteroskedasticity robust) standard errors of the estimate. \* (\*\*) {\*\*\*} signify statistical significance at the 5%, (1%), {0.1%} level, respectively

Among the other controls, by contrast, only the share of tertiary educated in 1991 is statistically significantly correlated to the changes in the number of enterprises between 1991 and 1997. Consistent with the literature on new enterprise formation in mature market economies (see Fritsch and Storey, 2014) a more highly educated population is statistically significantly positively correlated to the increase in the number of retailers per 100 inhabitants in transition.

For the Austrian border region results are less conclusive. The measure of foreign competition is statistically significantly negative in the specification controlling only for distance but loses significance once more variables are controlled for. The same applies to foreign market access. This has an unexpected statistically significant negative impact on the number of retail enterprises per 100 inhabitants when controlling for distance to the border as well as domestic competition and market access, but is statistically insignificant in all other specifications. Furthermore, among the control variables, only distance to the border and the share of the tertiary educated have a robust statistically significant impact on the change in the number of retailers per 100 inhabitants. The share of tertiary educated is positively correlated to the change in the number of enterprises per 100 inhabitants between 1991 and 1997. Distance to the border, however, is robustly statistically significantly negatively correlated to the number of enterprises created. This means that municipalities near the border saw higher increases in the number of retailers than those further away from the border rather than less, as would be expected if municipalities near the border were disproportionately affected by increased competition from abroad. Finally, the share of the population under the age of 15 is weakly significantly negatively correlated to the number of enterprises per 100 inhabitants. This may imply that a high share of very young population reduces new enterprise creation, potentially because young people are, all else equal, less prone to found enterprises.

In sum, our results, therefore, suggest that the founding of new enterprises in the Czech Republic was positively influenced by demand from Austrian consumers and negatively by the presence of Austrian competitors in the border region. By contrast, increased competition from the cheaper Czech retailers seems to have had no detrimental effects on the development of the number of enterprises in the Austrian border region.

Table 3: Estimation Results for Different Years

	1992	1993	1994	1995	1996
	Czech Republic				
Foreign market access	0.101 (0.111)	0.319 (0.179)	0.407* (0.187)	0.698*** (0.200)	0.803*** (0.219)
Foreign competition	-0.0291 (0.018)	-0.0525 (0.029)	-0.0637* (0.030)	-0.112*** (0.032)	-0.128*** (0.034)
N	1107	1107	1107	1107	1107
R-sq	0.058	0.064	0.088	0.114	0.134
	Austria				
Foreign market access	-0.005 0.004	-0.005 0.006	-0.006 0.007	-0.007 0.009	-0.011 0.011
Foreign competition	0.124 0.080	0.119 0.120	-0.060 0.155	-0.053 0.189	-0.153 0.226
N	395	395	395	395	395
R-sq	0.083	0.143	0.17	0.213	0.265

*Note:* Table displays regression results from estimating specification (4) of equation 1 in table 2 for different years. Coefficients for control variables (domestic market access and competition, distance, share of tertiary and secondary educated population, share of population aged under 15 and over 65, population density, terrain roughness, altitude and area) are not reported. Values in brackets are (heteroskedasticity robust) standard errors of the estimate. \* (\*\*) {\*\*\*} signify statistical significance at the 5%, (1%), {0.1%} level, respectively

## 5.2 Changes over time

One issue with respect to the results for the Czech Republic is that during the transition from a planned to a market economy, the Czech economy clearly was not in equilibrium, and residents, at least initially, were not accustomed to the workings of a market economy. This has led some authors to question the applicability of economic equilibrium models for the analysis of the transition period in general (see Shiller et al., 1992, for a contemporary debate) and to highlight the importance of assessing potential inherent parameter instability in econometric estimates for that period. Consequently, we re-estimated Equation (1) for each year from 1992 to 1996 (see table 3). For Austria, as expected, the results lead to no new insights. For the Czech Republic they, however, suggest some changes in the impact of both foreign market access and competition. Over the period considered, the coefficients of both variables increase in absolute size (from 0.001 to 0.008 for foreign market access and  $-0.0002$  to  $-0.0012$  for foreign competition) and attain statistical significance (at the 5% level or lower) only after 1993. After 1995, the estimates do not differ statistically significantly from those for 1997 any more. This suggests that while there



may have been some parameter instabilities in the first years of transition, the basic patterns found in our baseline estimates quickly established in the transition process and reached a stable level by around 1995.

Table 4: Estimation Results for alternative Sectors with Local Markets

	Gastronomy	Personal Services	Construction
	Czech Republic		
Foreign market access	0.277* (0.109000)	0.0904* (0.045400)	0.187 (0.123000)
Foreign competition	-0.0457** (0.017100)	-0.0128 (0.007370)	-0.0311 (0.020200)
N	1107	1107	1107
R-sq	0.113	0.050	0.082
	Austria		
Foreign market access	-0.0110* (0.005420)	0.000793 (0.002530)	-0.0128*** (0.003440)
Foreign competition	0.072 (0.141000)	-0.0832 (0.050300)	0.105 (0.086700)
N	395	395	395
R-sq	0.115	0.058	0.146

*Note:* Table displays regression results from estimating specification (4) of equation 1 in table 2 for other sectors than retail trade. Coefficients for control variables (domestic market access and competition, distance, share of tertiary and secondary educated population, share of population aged under 15 and over 65, population density, terrain roughness, altitude and area) are not reported. Values in brackets are (heteroskedasticity robust) standard errors of the estimate. \* (\*\*) {\*\*\*} signify statistical significance at the 5%, (1%), {0.1%} level, respectively

### 5.3 Results for other sectors

A further issue concerning the baseline results is that the opening of the border to the Czech Republic may also have had an impact on other sectors with a limited market extent in the border region. This applies in particular to other services for which consumers travel to the producer to consume the service. This may, however, also apply to services where producers travel to consumers to provide services that were, however, governed by somewhat more restrictive institutional regulations. We therefore also estimated Equation (1) for the hospitality and personal service sectors<sup>14</sup> as these are two further sectors, where cross-border shopping is often

<sup>14</sup>In the Czech Republic the gastronomy sector includes OKEC category 55 (hotels and restaurants) and personal services include OKEC categories 93 (personal services) and 527 (repair services). In Austria, descriptors according to NACE industry groups 55 and 56 were included in hospitality services and group 95 in personal

found to be highly relevant. Further, we also considered the construction sector.<sup>15</sup> This is a primary example of a sector where producers move to consumers to provide services, in which, however, market entry (up to 2011) required producers at both sides of the border to apply for a license in the receiving country if they wanted to export their services.<sup>16</sup>

The results of this additional analysis (reported in table 4) are once more inconclusive for Austria. For the Czech Republic, they suggest that gastronomy and personal services followed similar patterns to those in the retail trade sector. In these sectors, foreign market access increased the number of enterprises residing in a municipality, but marginal effects were smaller (0.003 in gastronomy and 0.0009 in personal services). At the same time increased competition from abroad had a statistically significant negative impact on the gastronomy sector only. Here, too, marginal effects were substantially and statistically significantly smaller than in retail trade. For the construction sector, reflecting the substantially more restrictive market entry barriers for foreign providers on both sides of the border, no similar robust impacts are found.

## 6 Robustness

Finally, we were also concerned that some of the subjective choices made in the analysis such as the choice of the distance decay parameter and the definition of the border region may have a crucial impact on results. Therefore several robustness tests were conducted. In one set of tests, we varied the size of the border region analyzed to include regions within 40 and 80 km from the border. In another set we varied the distance decay parameter in our measurement of market access and competition from -1 to .0.75 and 2.<sup>17</sup>

The estimates (in Table 5) suggest high robustness of the baseline results with respect to changes

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services.

<sup>15</sup>This includes descriptors falling into NACE sector C in Austria and OKEC group 45 in the Czech Republic.

<sup>16</sup>This regulation stayed in place after the Czech Republic joined the EU and ended only with the end of derogation periods in 2011. Its aim was to avoid “unfair” competition from Czech producers and to ensure foreign providers complied with national labour and product market regulations.

<sup>17</sup>In consequence foreign and domestic market access and competition were calculated as  $DMA_{it} = \sum_{j \in D} P_j / (d_{ij}^{0.75})$ ,  $FMA_{it} = \sum_{j \in F} P_j / (d_{ij}^{0.75})$ ,  $CD_{it} = \sum_{j \in D} N_j / (d_{ij}^{0.75})$  and  $CF_{it} = \sum_{j \in F} N_j / (d_{ij}^{0.75})$ , respectively in the first experiment and as  $DMA_{it} = \sum_{j \in D} P_j / (d_{ij}^2)$ ,  $FMA_{it} = \sum_{j \in F} P_j / (d_{ij}^2)$ ,  $CD_{it} = \sum_{j \in D} N_j / (d_{ij}^2)$  and  $CF_{it} = \sum_{j \in F} N_j / (d_{ij}^{0.75})$

in the definition of border regions. Throughout, the coefficients of the impact of the foreign market access and foreign competition change by less than 0.001 and remain statistically highly significant. Changes in the parametrisation of the distance decay function have a slightly larger impact on the estimates. The estimated coefficients for both foreign market access and competition decrease in absolute size for parametrisations using a slower distance decay (i.e. with  $\gamma = 0.75$ ), and increase in parametrisations using a more rapid distance decay (i.e. with  $\gamma = 2$ ). Irrespective, however, both coefficients remain statistically highly significant throughout.

Table 5: Estimation Results using alternative distance Decay functions and Definitions of the Border Region

	$\gamma = 0.75$	$\gamma = 2$	Border Region (40 km)	Border region (120 km)
	Czech Republic			
Foreign market access	0.282** (0.093)	22.19*** (6.300)	0.618* (0.260)	0.944*** (0.212)
Foreign competition	-0.0434** (0.0148)	-3.765*** (1.0380)	-0.0952* (0.0407)	-0.152*** (0.0329)
N	1107	1107	737	1438
R-sq	0.120	0.10	0.14	0.12
	Austria			
Foreign market access	-0.00654 (0.004)	-0.276 (0.621)	-0.0185 (0.014)	-0.0076 (0.011)
Foreign competition	-0.0212 (0.101)	-16.000 (10.720)	0.0337 (0.283)	-0.477* (0.237)
N	395	395	260	467
R-sq	0.268	0.264	0.282	0.237

*Note:* Table displays regression results from estimating specification (4) of equation 1 in table 2 using alternative parameter for the distance decay function and alternative definitions of the border region. Coefficients for control variables (domestic market access and competition, distance, share of tertiary and secondary educated population, share of population aged under 15 and over 65, population density, terrain roughness, altitude and area) are not reported. Values in brackets are (heteroskedasticity robust) standard errors of the estimate. \* (\*\*) {\*\*\*} signify statistical significance at the 5%, (1%), {0.1%} level, respectively

## 7 Summary and Conclusions

In sum, results suggest that the founding of new retail enterprises in the border region of the Czech Republic was positively influenced by the additional demand from Austrian consumers and negatively by the presence of Austrian competitors after the fall of the Iron Curtain. According

to our results, a one standard deviation increase in a municipality's market access located in Austria increased the number of retail enterprises per 100 inhabitants by 2.91 in the Czech border region in 1997. Also, as hypothesized, market entry was noticeably smaller in municipalities, where, given market access, competition from Austrian producers was more intense. A unit increase in our measure of market competition reduced market entry by 2.85 enterprises per 100 inhabitants. In addition, we find that despite some instabilities in early transition, the basic patterns in our baseline estimates established rather rapidly and reached a stable level by 1995. Further next to retail trade also enterprises in the gastronomy and personal services sector profited, albeit to a lesser degree, from the opening of borders. Construction, by contrast, reflecting more restrictive export regulations, was largely unaffected.

For Austria results are less conclusive due to data limitations. Nonetheless, we find no strong evidence of a detrimental impact of the increased competition from the cheaper Czech retailers on the development of the number of retail enterprises. Although measures of the extent of competition in the border region have a significant negative effect on the increase in the number of retail enterprises in some specifications, they quickly lose significance when adding controls.

These findings are of obvious interest for the academic debate as they provide novel evidence on the importance of market access and spatial competition for the location decision of enterprises, using a heretofore little analyzed quasi-experimental cross-border setting. They are also of interest for the specific case we study, as private sector development was one of the central policy priorities in post-communist Czechoslovakia. The results may, however, also be interesting in a wider policy context, as private sector development is also often a main objective of market-oriented reform programs in other countries and because fears of increased competition are a central concern in debates on trade liberalisation irrespective of whether they are related to locally or internationally traded goods. In this respect, our results point to a complementarity between the policy objectives of liberalising cross-border exchange and private sector development.

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