ENTERPRISE ZONE TAX EXEMPTION POLICY IMPACT EVALUATION IN RURAL REGIONS OF ARMENIA

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***Introduction*.** To foster social and economic progress in Armenia's border regions, the government enacted legislation in 2015 establishing enterprise zones, which offer tax exemptions to businesses operating in targeted areas. Specifically, enterprises in rural border regions are exempt from turnover, VAT, profit, and license taxes, with the exception of certain activities like passenger transportation or totalizators. Existing literature predominantly questions the efficacy of tax exemption policies. It suggests that such measures are primarily warranted to address market failures [Howel, et al., 2002, 1500], with the program's impact contingent on policy design, broader tax environment, and unique regional characteristics [Lerch, 2004, 16]. Givord, Rathelot, and Sillard's [2011, 159-162] analysis of France's enterprise zones program indicates that while it positively influenced economic activity within targeted areas, any benefits generated were counterbalanced by adverse effects on neighboring regions. On the other hand, it is important to evaluate the results from all of the perspectives, Baghdasaryan and Sarikyan [2023] evaluated the tax exemption impact with difference-in-differences fixed effects estimator and initially found a negative impact on income. However, as the results were counterintuitive findings, they decided to assess the administrative factors and after including audit probabilities into the analysis and the decreased probabilities of those enterprises explained the negative results.

Data provided by the State Revenue Committee of RA for academic inquiry, comprises an exhaustive unbalanced panel spanning from 2013 to 2017, totaling 24,785 observations. It includes only taxpayers for the interested areas and covers 4 years of data, as a result all of the visualizations and analysis are based solely on that data in order to examine the operations of enterprise zones in detail. One notable advantage of this research is its inclusion of the relevant population, thus avoiding sampling or selection biases. The dataset segregates businesses into border (treated) and non-border (control) groups based on their actual operational presence in exempted regions. Addressing a challenge in identifying operational addresses (as tax declarations only furnish legal addresses), the data utilizes turnover information specific to border regions for classification.

The primary contribution of this paper lies in its thorough exploration and analysis of the data, particularly through in-depth exploratory techniques. Furthermore, it offers a comprehensive evaluation of results using survival analysis methods. The results reveal a

pronounced disparity between the intensive and extensive margins in border regions, with the former notably outweighing the latter. This suggests that the majority of turnover variation can be attributed to factors associated with the intensive margin, indicating a substantial reliance on existing business activities rather than the creation of new enterprises.

Methodology. In order to understand the dynamics and trends of the region, this paper examines whether the positive change in the turnover is attributed to the rise of the number of new businesses in the region (extensive margin) or the improved operations of existing businesses (intensive margin). In the majority of cases, the change is attributed to the interaction effects of the two factors and it is essential to measure magnitude and influence of each margin on the observed output. Implementing the same framework as Fernandes, Klenow, Meleshchuk, Pierola, and Rodríguez-Clare [2018, 6], the variation in overall turnover across regions is estimated by intensive margin elasticity (IME). IME is the slope of the regression line and is determined by an OLS regression of ln(xi) on ln(Xi) with the origin and destination FE, for a given year. The paper discusses group wise analyzes for each year and each region and then compares results. More specifically, the average number of companies is calculated for each community in both groups per year, which was merged with the original data of individual companies.

Equation 1.

$$Lnx_{ij}=\alpha*\ln X_{ij}+\varepsilon_{IJ}$$

Xi is the total turnover for each year per region i, Ni is the total number of businesses, xi= Xi/Ni is the average turnover per year for region i, ln[xi] and ln[Ni] are intensive and extensive margins respectively. Extensive margin elasticity [EME] is the opposite of intensive margin and satisfies the following equation; EME=1-IME.

Literature Review. This section aims to outline the key theoretical concepts and academic background relevant to our research and its methodology. Numerous studies have explored the impact of tax exemptions on businesses and economic development, yielding conflicting findings. Lerch [2004, 20] suggests that taxes have a limited influence on business decisions and economic activity, with their effect contingent on policy design and the broader tax framework. In "Design and Assessment of Tax Incentives in Developing Countries" [2018], the cost-benefit analyses of tax incentives against lost tax revenue or economic activity indicate that, from a purely analytical perspective, tax incentives are consistently less effective than nationwide tax reforms, as they fail to target specific sectors. James [2013, 55] infers that incentives should be used as minimal as possible and ideally should be linked to investment growth. Moreover, according to him, the incentives have a greater possibility of being successful if the government is effective and more democratic. Glaeser [2001, 11-14] states that place-based tax incentives will improve the efficiency of firms' location decisions and will maximize total social surplus, in all cases except the cases when these incentives are driven by corruption or other

influence types. Lockwood and Shawn [2015, 5-9] state that enterprise zones become attractive to households and the reduction in poverty can be because of high-income households' migration into the area, thus the program's purpose of aiding the most in need group of residents has a little impact. Moreover, Baghdasaryan and Sarikyan [2023, 12] found that the location-based incentives in reality, positively affect the employment which is very important for overall well-being in the rural regions. Nevertheless, governments continue to promote the development of economic activities through tax exemptions. To enhance the business landscape and attract investment while fostering rural development, the Armenian government enacted a dedicated legislation known as the HO-156-N bill in January 2015. This bill established enterprise zones, delineated geographical areas where specific tax incentives and regulatory exemptions are offered to bolster economic growth in those regions. A total of 30 areas were designated under this legislation, each benefiting from tailored tax exemptions aimed at stimulating local development. The strategy of targeting geographically challenged areas to address their decline is a widely recognized approach, as seen in France's implementation of Zones Franches Urbaines (ZFU) and Zones de Revitalisation Urbaine (ZRU) in 1997, 2004, and 2006. ZFU provided substantial tax exemptions, including business and corporate taxes, and social security contributions, particularly benefiting the most disadvantaged regions. Givord, Rathelot, and Sillard [2011] studied the impact of the second phase of ZFU, where 41 firms were relocated from ZRU to ZFU regions. Their findings indicate a positive effect of ZFU on efficiency, reducing the number of existing firms (intensive margin) and potentially boosting the creation or relocation of new firms (extensive margin) in treated regions. However, the benefits were tempered by negative effects on surrounding regions, notably a decline in the growth rate of new and relocated businesses.

Neumark and Kolko [2010, 24-29] assessed California's Enterprise Zone policy, focusing on incentives for hiring "disadvantaged" employees. They found a consistent negative impact on employment, attributed to California's unique tax system allowing retroact-tive credit claims up to four years. Mayneris and PY [2013] argue that while most research on the efficacy of enterprise zones assumes uniform policies across all sectors, there is inherent heterogeneity. Factors such as the initial characteristics of the zone, industrial sector involvement, and policy design specifics can significantly impact effecttiveness. Hence, thorough analysis of regional heterogeneity is crucial for optimizing policy outcomes.

Scientific Novelty. The novelty of this study resides in its detailed investigation and examination of the data, employing intensive exploratory metrics. Additionally, it provides a comprehensive assessment of outcomes utilizing survival analysis techniques. Findings expose a significant contrast between the intensive and extensive margins within border regions, with the former demonstrating considerable dominance over the lat-

ter. This implies that the primary drivers of turnover variation are linked to factors pertaining to the intensive margin, highlighting a substantial dependency on established business operations rather than the inception of new ventures. The results are also confirmed by high survival rates in border regions, indicating potential barriers to entry for the new firms, due to well-established practices or simply small market in rural underprivileged regions.

Analysis. The dataset comprises unbalanced panel data, characterized by a wide range of observations, encompassing all existing businesses within the Tavush Region, totaling 24,785 entries spanning from 2013 to 2017. This comprehensive dataset was graciously provided by the State Revenue Committee of RA (SRC) in response to an official request for academic research purposes. To safeguard the confidentiality of business-specific details and prevent any inadvertent disclosure of personal information, stringent measures were taken to anonymize the data and uphold tax secrecy regulations. The information extracted from tax reports, completed by taxpayers, includes distinct entries for non-taxable turnover associated with border trade and production, aiding in the identification of privileged businesses. Additionally, each company's registered address, serving as its legal domicile, is documented in the report, which may differ from its actual operational location. However, SRC has confirmed that in the majority of cases, these addresses align. Therefore, it is presumed, based on expert insights, that the legal address corresponds to the actual place of operation for most businesses. The variables which were provided are the business establishment date, status change date, region, sector, paid taxed and other fees, the taxable amount of VAT and total circulation, borderline trade and production turnover, the total number of employees, and salary budget.

It is important to note, that being in the privileged zones does not necessarily ensure that the enterprise is utilizing the tax exemption opportunity. Therefore, the labeling was not done based on the tax-exempted locations, but rather, based on the tax declarations, as whether the borderline trade or production cell was filled in any year between 2015 and 2017, as it ensures that the enterprise is taking the advantage of the exemption opportunity. Data contains a significant number of missing values, all of which were imputed with 0 and includes outliers. As a result, there are a total of **2,632** borders and **22,153** non-border observations. Table 1 presents total number of companies each year:

Table1. Number of Companies per Region

Region	2013	2014	2015	2016	2017
Border	414	461	555	593	609
Non-border	4,015	4,152	4,347	4,656	4,983

Meanwhile, it is assumed that there is a difference whether the firm stopped operation in that year or even was not established yet and the fact that the particular values were 0 for the analyzes. Therefore, the data includes only active companies, that is the company

with 0 turnover is included in the data only if its status is "Active". Baghdasaryan and Sarikyan [2023, 4] extensively discuss the institutional setup for the policy and ways for identifying whether or not the companies are truly operating in the privileged regions. It is important to note that while the main population of interest is the same in both of the papers, for survival analysis purposes the author included the whole population operating in the selected region. Therefore, this part of the paper presents the results of descriptive analytics, which was implemented for unfolding the main trends and patterns in the data.

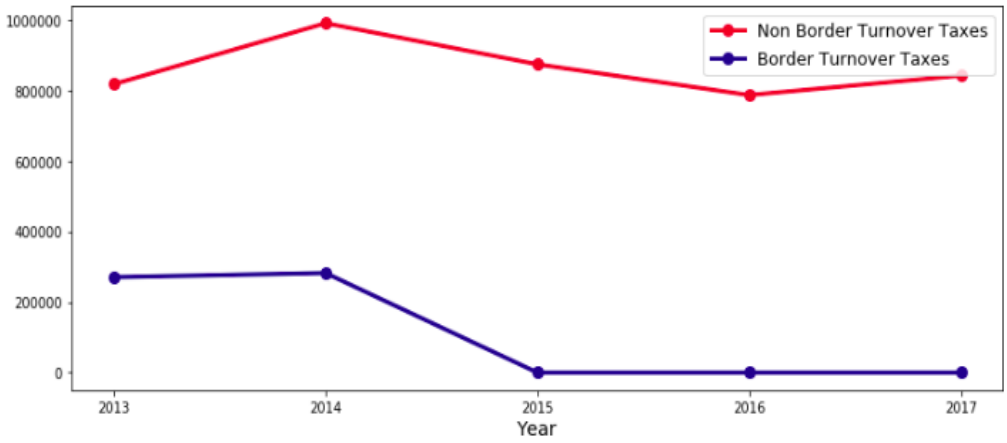

Figure 1. Total turnover taxes for border and non-border regions over time

Figure2 demonstrates that the increased total tax payments in the frontier region were mainly attributed to the increase of the employment mean in 2017, which was expected as the law does not affect the tax payments connected to the workforce.

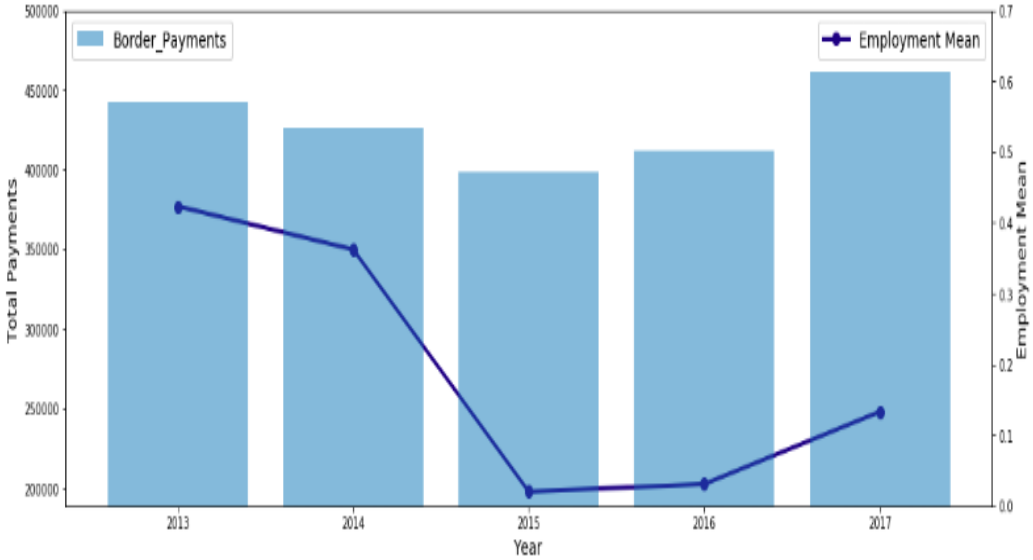

Figure 2. Borderline average number of employees and total tax payments

Figure 2 reveals that from 2013-2016, the mean of employment in the borderline mostly was constant and from 2016 it experienced a slight increase. Moreover, t-test inferential statistical technique between the employment means of two groups and between the pre-treatment and post-treatment period was implemented. Expectedly, there is a signifycant difference between the treated and control groups, as a p-value is smaller than 0.05 threshold. However, the difference between the pre-treatment and post-treatment period for both groups was not significant, they have p-values higher than 0.05 threshold.

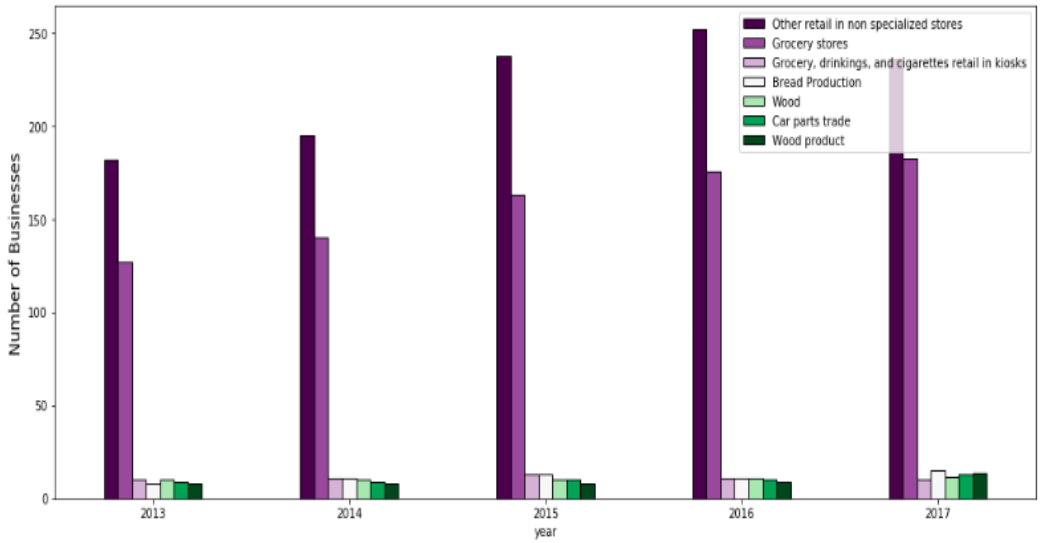

Figure3. Sector category breakdown

The findings suggest that the policy has not influenced employment. Figure3 demonstrates the total number of companies in the top 5 occupied sectors.

Table2. Surviving rate for the reference[1]

Reference Year/ t	Border region					Non-Border region				
	2014 (%)	**2015 (%)**	**2016 (%)**	**2017 (%)**	**2018 (%)**	**2014 (%)**	**2015 (%)**	**2016 (%)**	**2017 (%)**	**2018 (%)**
2013	93	90	76	76	69	71	48	37	34	34
2014		90	85	77	67		66	52	46	39
2015			83	66	60			69	54	47
2016				87	68				71	56
2017					82					79

The survival rates estimation indicates that the rates in both regions are similar to each other.

[1]Location-Based Tax Incentives for Non-Farm Rural Enterprises in Armenia: www.tandfonline.com

Interestingly only the top 2 most occupied sectors, which are related to the trade experience growth of companies. In order to identify the major behavioral patterns in the region, it is essential to consider and evaluate the percentage of surviving firms. The survival rate is defined as the number of companies born in x-year that exist till t-base year, divided by the total number of companies established in x year [Baghdasaryan and Sarikyan, 2023, 9]. In survival analysis, we use information on event status and follow up time to estimate a survival function, in this study, the outcome is how long does the particular company operated.

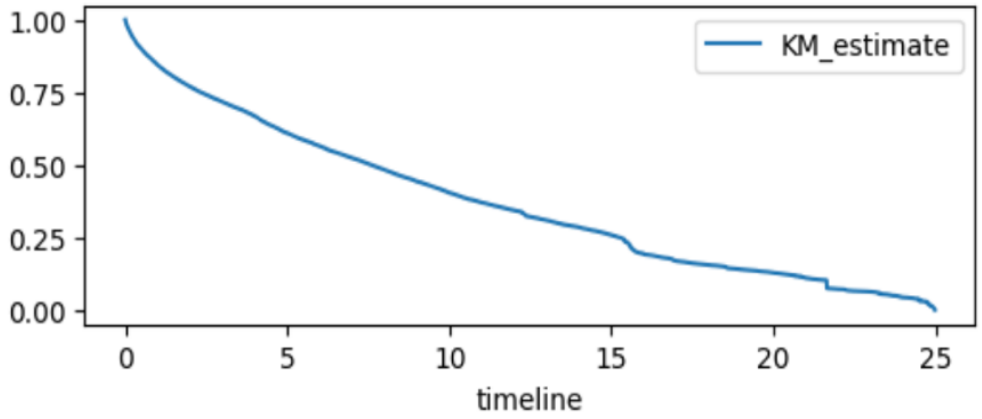

Figure 4. Survival curve estimated with Kaplan-Meier Filter

Figure4 shows Kaplan-Meier Curve, a simple non-parametric visualization of survival likelihood function. We can see that probability of a company operating longer than 1 years is around 88%, but probability of surviving longer than 5 years is dropped to 63%.

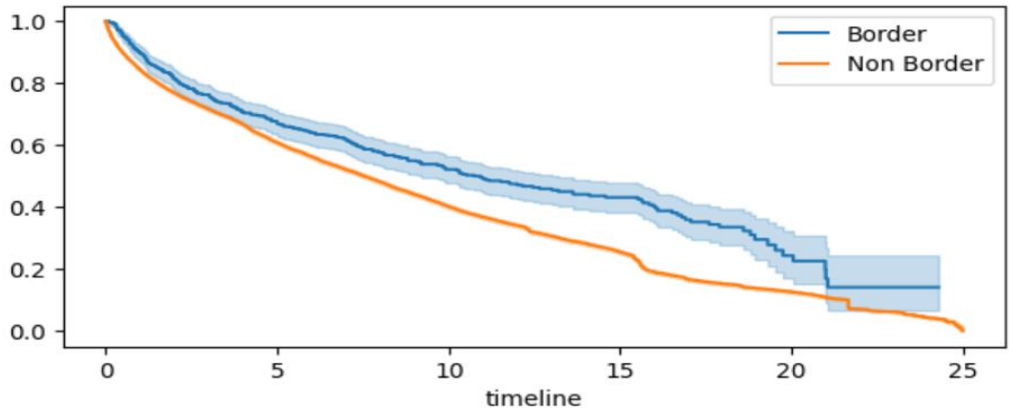

Figure5. Survival Function for border and non-border regions

A Kaplan-Meier plot can also be used to analyze the differences in survival risk for border and non-border regions. Figure5 shows the survival probability for treatment and control groups separately, and interestingly the companies in border regions have higher

survival likelihood, meaning higher probability to operate longer. Interestingly this is also confirmed based on the results from the table2, where again survival rate is overall higher in border regions. The analysis of intensive and extensive margin results for both groups during the 2013-2017 are presented below;

Table 3. Intensive (IM) and extensive (EM) margin results

	IM	EM
Border	75.2%	24.8%
Non-Border	60.7%	39.3%

The results suggest that e intensive margin (IM) exhibits a greater magnitude in the border region, with linked fluctuations in average turnover per enterprise, rather than number of companies. Taking into account the results of survival analysis, this can be explained that in border regions companies exist longer and have established practices, which can make it difficult for new companies to enter the market.

***Conclusion*.** In conclusion, this study delves into the impact of enterprise zones in Armenia's rural border regions, designed to stimulate social and economic advancement through tax exemptions. Through an assessment of both extensive and intensive margin outcomes, the effectiveness of the program in driving development is evaluated. The results suggest that IM is higher in the borderline region, indicating that around 75.2% of variation in the total turnover is attributed to the variations in the average turnover per enterprise, while only 24.8% to the number of companies. In addition, by employing intensive exploratory techniques and survival analysis methods, the study meticulously investigates and interprets the data, uncovering a notable gap between intensive and extensive margins within border regions. This indicates a significant reliance on pre-existing business activities rather than the establishment of new enterprises. In summary, this research substantially contributes to the comprehension of tax policy efficacy and offers crucial insights for policymakers aiming to boost economic development in Armenia's border regions.

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Enterprise zone tax exemption policy impact evaluation in rural regions of Armenia

Key words: tax exemptions evaluation, economic development, descriptive data analysis, extensive and intensive margins, survival analysis

This paper investigates the impact of enterprise zones in Armenia's rural border regions, established to promote social and economic progress through tax exemptions. By focusing on extensive and intensive margin outcomes, it evaluates the effectiveness of the program in fostering development. While the initiative aims to encourage new business creation, the study finds that turnover variation, particularly among existing enterprises, significantly influences the program's impact. This challenges prevailing notions about the efficacy of tax exemption policies, suggesting a need for nuanced approaches tailored to address specific market failures. An advantage of this research lies in its inclusive population sampling, which minimizes biases and ensures the reliability of findings. Utilizing data from the State Revenue Committee spanning 2013 to 2018, the study differentiates between treated and control groups based on operational presence in exempted regions. Overcoming challenges in identifying operational addresses, the data utilizes turnover information specific to border regions for classification. The study employs intensive exploratory techniques and survival analysis methods to thoroughly explore and analyze the data, revealing a pronounced disparity between intensive and extensive margins in border regions. This suggests a substantial reliance on existing business activities rather than the creation of new enterprises. In summary, this research contributes to the understanding of tax policy effectiveness and offers valuable insights for policymakers seeking to foster economic development in Armenia's border regions.