**Final Project Draft**

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**Introduction**

Starting from 1972, China has started to restricting population through family planning policy, by providing pecuniary incentives for those who space the birth of their children 4 years apart. Following that, a stricter One Child Policy (OCP) was released in 1979, which only allowed each family to have 1 child, and violating the law will be subject to financial penalties proportional to household annual income (Ebenstein, 2010; Wei and Zhang, 2011).

Nonetheless, the implementation of OCP is heterogenous, as some provinces received preferential treatment – the Han-Minority family are allowed to have more than one child. We use non-preferential OCP and strict OCP interchangeably hereafter. In our study, we take the presence of preferential policy endogenous, and hence, endogenize it with a spatial Regression Discontinuity Design (RDD). We choose the provinces whose neighbour province have different strictness of OCP, and then, isolating the cities that lie on the border to be the observations. By doing so, we are able to find plausible causal link between the strictness of OCP to other outcome of interests in the long-run, with a unique comprehensive city level panel data from 2003 to 2020.

Additionally, we employ a placebo test by using the successor of OCP, the Two-Child Policy (TCP) that replaced OCP in 2018 due to the concern of population aging by the authority. The TCP is again national without homogenous treatment, i.e., no difference in strictness and preferential treatment. Again, we use the same border cities to check whether the outcome of interests that are significant in such placebo test, and it is not except of the CPI in 2004. As the TCP started in 2018, so we change the window to 2016-2020 period and run the test. Our research could shed a light to the government of the long-run effect of birth control policy (OCP), and the placebo test also works as a check of how the effectiveness of a successor policy (TCP) could be influenced by the strictness of its predecessor (OCP). Furthermore, the research would enlighten policymakers, not only in China, to re-consider the correct incentives and solutions for population aging, considering it becoming a prevalent issue around the world.

**Related Literature**

The OCP, especially its negative spillovers, have been well-studied. From the missing girls (Sen, 1990; Ebenstein, 2010; Chen, Li and Meng, 2013; Jayachandran, 2017; Almond, Li and Zhang, 2019) to the abandoned children (O’Connell Davidson, 2011; The State Council, 2011); From the schooling disadvantages to (Qian, 2009) to the distortive financial activities (Wei and Zhang, 2011; Bao et. al., 2019). However, to the best of our knowledge, we are the first to research the long-run effect of OCP with novel spatial RDD and link it with its successor. In these literatures, we find out that the causal interpretation is not necessarily sound. For example, Bao et. al. (2019) run a simple OLS to analyse the causality between OCP and the child abandonment and abduction, exogenized by sex ratio at birth (SRB). But, we find the linkage between gender preference with SRB across regions implausible, as the covariates like clan culture, lineage (kinship), suitability of rice, and other factors that have been proved to be strongly influential are not included (see e.g., Talhelm et. al., 2014; Tang & Zhao, 2023; Chen et. al., 2024).

**Data Source**

We merge couple of datasets from the literature of Chen et. al. (2024), in which we obtain the prefecture-level panel data from 2003 to 2020. The OCP strictness data is manually scripted from National Health and Family Planning Commission of the people’s Republic of China, which has been used widely (see Huang et. al., 2023 for example). Lastly, we manually obtain the distance between two cities with Google Map. To avoid the bias that some of the transit, e.g. highspeed train *(gaotie)* wasn’t available back then, we use the car driving distance in kilometers instead. For simplicity, we took the shortest car driving distance, as old cross provincial roads are typically straight and mostly used. The longer road, e.g., costly charged highways that are more likely to be built later, are not considered.

**Methodology and Statistical Result**

**Statistical Approach**

In our paper, we use the spatial regression discontinuity design (RDD) that exploits the One-Child Policy (OCP) strictness that is orthogonal to our outcome variable of interests. To the best of our knowledge, the strictness of OCP, or whether a province receives preferential OCP that allows family to have more than one child, only correlates to the share of minority in the province. However, if we zoom into the border city between two provinces with different OCP strictness, such difference between trivial, and the assumption of exogeneity of OCP strictness becomes innocuous.

*Yj = Dj \* Xj + aj + ej*

In the regression above, Y is the outcome variable of interests. Dj is the dummy variable of whether city j is a border city with another province. Xj is the geographic location of the border city j. It is the distance of j in preferential OCP province to another border city in another province without preferential OCP. Therefore, for a border city j that has positive value of Xj, j would be in the province with preferential, less strict OCP and is Xj, in unit of kilometers, away from the next border city of another province, where the OCP is more strict, non-preferential. aj is the vector of provincial and year fixed effect, and ej is the error term.

**Regression Results**

*Geographical Effects on Marriage*

Interestingly, we find out multiple outcome variable of interests to be significant. First, in Figure 1, the number of divorce cases received by provincial courts significantly jump down by 30 thousands when we move from a non-preferential-OCP province to a preferential-OCP province. More importantly, as the non-preferential-OCP cities move closer to the preferential-OCP, the divorce cases increase. Recall that in our design, year and provincial fixed effects are included, and hence, the only way we can interpret the result is from the resentment and desperation of having more than one child.

**Figure 1**

*Regression Discontinuity between Distance to Border and Divorce Cases*

A graph of a line graph

Description automatically generated with medium confidence

For the preferential-OCP border cities that are closer to the non-preferential-OCP border cities, the citizens are more likely to receive the information about the family situations, i.e., number of kids, from another province. So, the citizens, especially female, who live in preferential-OCP city may compare their potentially more demanding childcare and financial stress with their neighbours who are only allowed to have one. Hence, the number of divorces gradually increased, and once we changed to cities with strict OCPs, the number of divorce cases significantly dropped, leaving us a flat line after the cutoff.

*Effects on Economy Factors*

On the other hand, the regression result also indicates the influence of OCP on economic factors, mainly on the factors heavily based on population supply.

**Figure 2**

*Regression Discontinuity between Distance to Border and GDP in Secondary Industries*

*图表, 散点图

描述已自动生成*

**Figure 3**

*Regression Discontinuity between Distance to Border and Housing Price Growth Rate*

*图表, 散点图

描述已自动生成*

Figures 2 and 3 illustrate the GDP in secondary industries and average housing price growth rate separately, where an apparent gap could be observed between strict OCP cities and non-strict OCP cities. This could be explained by the loss of labour force, where strict OCP regions will have a lower population growth rate over time, which lowers the labour force supply. This matched with the time span of the dataset; the first few generations born under OCP were already at working age. Besides, the secondary GDP in cities with less strict OCP have relatively stable distribution over distance to the border; strict OCP cities have a sharp decreasing pattern as distance to the border increases by contrast. The same pattern could be observed between distance to border and housing price. Although this pattern seems illogical, the main cause is the population movement from a less strict OCP region to a strict OCP region. This will be explained by the price level data below.

**Figure 4**

*Regression Discontinuity between Distance to Border and CPI(Base 2004)*

*图表, 散点图

描述已自动生成*

Furthermore, it is clear that the consumer price index in strict OCP regions is significantly lower than in non-strict regions, based on Figure 4. This illustrates the potential population movement from a non-strict region to a strict OCP region. Because of the collective effect of lower living costs, lack of labour supply, less competition and higher quality of education for children, people started moving to strict OCP regions on a vast scale that mainly focuses on border cities where they can easily commute back to their hometowns. As the population in border cities in strict OCP regions grows, the labour-intensive secondary industry output increases. This is also the reason why both the housing price growth rate and industry output have diminishing patterns from the border to the center of the region.

**Placebo test with Two-Child Policy**

To confirm that our RDD design does capture the unique causality between OCP strictness and the long-run variation of outcome variables, we run a placebo test by specifying the model to capture the effectiveness of the Two-Child Policy (TCP) instead. According to our specification and the nature of spatial RDD, such variation of outcome variables should only happen when we switch between provinces with different strictness of OCP, and hence, when the TCP replaces the OCP as a national policy without any heterogeneity of strictness, we should not observe the same effect significantly. Empirically, we switch the time window to after 2018, when the TCP started. Not surprisingly, we do not see any significant results but the CPI in 2004 values, which could come from the long-term effect of population shrink after OCP, which has not faded even when the TCP has kicked in. Figure 5 below is an example shows the closed gap at the cutoff for House Price Growth Rate, the counterpart of Figure 3.

**Figure 5**

*Placebo Regression Discontinuity between Distance to Border and Housing Price Growth Rate*

A graph with blue and red dots

Description automatically generated

**Conclusion**

The sense of family and family per se units Chinese more than any other part of the world, and the One-Child Policy (OCP) indeed significantly shocked the lives of many. In our research, we find out the long-term effect of the strictness of OCP and the exploitation of the natural province border using Regression Discontinuity Design, which enables us to interpret the result causally. We see that the strictness of OCP can reduce the number of divorces, possibly through lower financial and time burdens, and the lower price it brings could motivate population movement across regions. Hence, our further study will dive into the deeper cause of these factors we observed with qualitative evidence like interview. At the same time, future study should focus on a finer spatial resolution, and researching on a county-level data for a more subtle and accurate treatment effect.

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