

# The authoritarian trade-off: A synthetic control analysis of development and social coercion in the Xinjiang Uyghur autonomous region

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## Abstract

The Xinjiang Uyghur Autonomous Region (XUAR) has recently experienced a series of policies seeking economic development and intensive methods of social coercion. A unique leader, Chen Quanguo, brought these changes to the XUAR in 2016. This paper seeks to examine the effects of Chen's regime. We specifically examine three outcomes: GDP per capita, arrest rates, and spending on public security. Using the synthetic control method, we find that Chen's regime had no significant effect on the development. However, his policies led to much higher rates of arrest and larger spending on public security.

## KEYWORDS

China, regional development, religious persecution, synthetic control method, Xinjiang

## JEL CLASSIFICATION

K38, K42, P37, R11

## 1 | INTRODUCTION

Recently, the United States passed the Uyghur Human Rights Policy of 2020, which condemns “gross human rights violations of ethnic Turkic Muslims in Xinjiang, and calling for an end to arbitrary detention, torture, and harassment of these communities inside and outside China” (S. 3744, 2020). On July 9, 2020, the United States Department of the Treasury imposed sanctions on Chen Quanguo, along with three other top officials in the Xinjiang Uyghur Autonomous Region (XUAR).<sup>1</sup> It is the first time that the United States sanctioned a member of the Politburo of the Communist Party of China (CPC).

Since 2016, the XUAR, one of the five autonomous regions of ethnic minorities, has experienced a series of policies sought to bring about economic development and intensive maintenance of social stability methods.<sup>2</sup> A unique leader, Chen Quanguo, brought these changes in the XUAR with a bundle of policies focused on economic development and social coercion. Chen was appointed by the CPC as the party secretary of the XUAR in 2016. Chen previously served as the governor of Hebei in 2009 and was promoted as the party secretary of the Tibet Autonomous Region (TAR) in 2011.<sup>3</sup> Under Chen's tenure, the XUAR has witnessed higher economic growth than previous years, which reversed the

**Abbreviations:** BRI, Belt and Road Initiative; CPC, Communist Party of China; CPSs, Convenience Police Stations; ETIM, East Turkestan Islamic Movement; NBSC, National Bureau of Statistics of China; OBOR, One Belt and One Road; RMSPE, Root Mean Square Prediction Error; SAIC, State Administration of Industry and Commerce; SCIO, State Council Information Office; SMC, Synthetic Control Method; TAR, Tibet Autonomous Region; XUAR, Xinjiang Uyghur Autonomous Region.

consecutive economic downturns. However, Chen's methods of maintaining social stability have received critics from the international community, claiming that his policies violate basic human rights and persecute religious minorities. Given that the assignment of political leaders to regions in China is not a random process, we utilize a quasi-experimental method to track what would have happened had Chen not been assigned as party secretary to Xinjiang.

In this paper, we use the Synthetic Control Method (SCM) to examine the effects of Chen's policies, both in terms of economic outcomes and social coercion. By using the SCM, we create a counterfactual Xinjiang in order to compare post-treatment outcomes of this generated counterfactual with real Xinjiang. The counterfactual seeks to track what would have happened in Xinjiang had the region not had Chen as the regional leader. Based on our analysis, we observe lower incomes between Chen's reign in Xinjiang and the counterfactual, albeit statistically insignificant. However, our measurements of social coercion greatly increased during his tenure. Our results suggest that this social coercion came at the cost of economic development, suggesting a trade-off between economic growth and social coercion.<sup>4</sup>

Our paper is related to the literature on the impact that leaders have on development and overall wellbeing. Jones and Olken (2005) suggest that leaders are highly influential in autocratic systems, where the executive faces fewer constraints. They argue that leaders are crucial in the growth of nations. However, Easterly and Pennings (2017) find that for the most part, national leaders do not significantly impact the country's growth rates. They find that only 7% (50 out of 750) of leaders had an impact distinguishable from zero.

While the two above studies examine leaders *generally*, others have used SCM to measure the impact of specific leaders. Grier and Maynard (2016) studied the impact of Hugo Chavez on the Venezuelan economy. They find a weak overall economic performance under Chavez's reign.<sup>5</sup> Despite the credit Castro receives for lower infant mortality rates, Bologna Pavlik and Geloso (2020) show that the Castro regime actually increased those rates relative to the counterfactual.<sup>6</sup> Zhou (2018) examines the economic impact of the former party secretary, Bo Xilai, in Chongqing, China. He concludes that while Bo's pro-economic development policies promoted the economy of Chongqing, his red-ideology movement undermined that economic growth in the short-run.

The rest of this paper is organized as follows. Section 2 gives details of economic policies and social stability maintenance since Chen's tenure in the XUAR. Section 3 discusses the synthetic control method. Section 4 describes the data. Section 5 reports the results. We conclude with Section 6.

## 2 | CHEN AND THE XUAR

The CPC has emphasized that maintaining social stability is a necessary condition to construct a harmonious society.<sup>7</sup> For a long time, the CPC has viewed social stability in the western border regions to be especially critical for national security (SCIO, 2019). State Council Information Office (SCIO) (2019) stated they are most concerned about terrorism in the XUAR.<sup>8</sup>

After the incorporation into the People's Republic of China, Xinjiang became the second ethnic autonomous region in China in 1955. The XUAR is the western frontier of China, where it is considered one of the least developed regions in China. It is the largest administrative unit in the nation that comprises 18% of the total area of the country. Since 1990, a surge of violent conflicts has been observed in this region. After 9/11, the CPC reframed violent activities in the XUAR as acts of terrorism, which were generated from religious extremism, as China started to participate in the Global War on Terror. According to the official document of the State Council, "The Crimes of East Turkestan Terrorists," there were at least 200 incidents of terrorist attacks in the XUAR between 1990 and 2001. One hundred sixty-two people were killed, and 440 were injured in those incidents.<sup>9</sup>

Incidents of violent activities that were related to Uyghur "terrorists" were less frequent between 2003 and 2007. Such a reduction of violence, as Clarke (2008) suggested, could be attributed to several developments in Central Asian countries' efforts to suppress the "terrorism" in the regions. For example, the "East Turkestan Islamic Movement" (ETIM) was allegedly the main force that orchestrated terrorist attacks in XUAR. Its leader was killed during a raid in 2003. Authorities in XUAR also claimed that they had arrested suspects who were affiliated with a foreign terrorist organization. They were dispatched to XUAR to conduct sabotages in 2005. There was also a major raid that was conducted by the People's Armed Police in Akto County in the Pamir Plateau. Eighteen suspects were killed, and 17 were captured, who were later sentenced to life imprisonment or death. The police also seized a substantial number of firearms from the suspects' hideout.

A new wave of violent activities had resurged since the Urumqi Riots in 2009, which was initially a protest that escalated into city-wide violent activities by the Uyghurs population. At least 98 incidents that involved the Uyghurs

were reported in 2013 and 2014. Those incidents caused at least 656 deaths.<sup>10</sup> Because of the higher casualties from violent activities, the High Court, the High Procuratorate, and the Department of Public Security of XUAR made a joint announcement to initiate a “strike hard” campaign against violent terrorism. The campaign aimed at “striking hard at violent terrorisms, protecting citizens’ safety and properties, and maintaining public securities and social stability.”<sup>11</sup> This campaign was backed by the top officials of the party, as President Xi Jinping praised that “practice has proved that our party’s ruling strategy in Xinjiang is correct and must be maintained in the long run” (Wong, 2014, p. 6).

Despite all the effort, the pattern of violent incidents continued in 2015. It reflected in escalations in both severity and frequency. At the same time, the campaign cost the XUAR economically. In 2014, economic growth in the area barely reached 1% in the XUAR. The economy continued to be stagnating in 2015 with a growth rate that was significantly below the national average.

In 2016, Chen was appointed as the party secretary of the XUAR. The CPC believed that he would salvage the situation in the XUAR by growing the economy and promoting social stability in the region. During his tenure in Tibet, Chen was famous for his strategies to maintain social stability by suppressing dissidents of ethnic minority groups. Tibet also achieved high economic growth under Chen’s authority. The economic growth was the highest among other provinces and municipalities from 2012 to 2014. Since his tenure in the XUAR, Chen’s policies have focused on two subjects: economic development and maintenance of social stability.<sup>12</sup>

## 2.1 | Economic development<sup>13</sup>

The economic policies in the post-2016 era include reform of business licenses, enhancement of foreign trade, the promotion of tourism, and the rural development that aim to combat poverty, etc.

The XUAR developed a unique system of issuing business licensure under the business reform initiative of the State Administration of Industry and Commerce (SAIC).<sup>14</sup> This system was called the “integrating certificates into one.” In order to obtain business licenses, business owners used to have to obtain various certificates and inspections from multiple local administrative departments, such as the industry and commerce administration, the market regulation administration, the tax administrations, etc.<sup>15</sup> This cumbersome process unnecessarily increased the length for entrepreneurs to obtain permission from the administrations. The XUAR first integrated 12 certificates into one license in 2017. The reform of business licensure aimed at eliminating unnecessary transaction costs for entrepreneurs who intend to enter the market. It greatly simplified the process of acquiring business licenses.<sup>16</sup> In 2017, we observed a 16.8% increase in registered corporate enterprises. It included a near 30% jump in the number of registered private enterprises. This reform was modified in 2018 to integrate 26 certificates into one. Those additional certificates that can be integrated include certificates and inspections from other local administrative units, such as the department of public security and the department of treasury. In 2019, the numbers of private enterprises and individual industrial and commercial households were about 362,000 and 1,433,000, which were 18.6% and 28.1% increase from the previous year.

Because of the unique geographical location, the XUAR has been an attraction for tourism.<sup>17</sup> The XUAR has promoted the initiative of the “Tourist Xinjiang” to exploit such an advantage. The initiative mainly includes the building of unique brand names for the natural scenic areas, the expansion of the marketization of tourism, and the enhancement of infrastructure for tourism.<sup>18</sup> In 2017, the XUAR had around 107.2 million tourists, which was a 32.4% increase from 2016. This number was 213.3 million in 2019, an increase of 42% from the previous year. The growth rate of the revenue from tourism has increased at faster rates since 2016 as well. The total revenue of tourism was 182.1 billion yuan in 2017. It was a 30.1% increase from the previous year. In 2019, the revenue was 363.25 billion yuan, which was an increase of 40.8% from 2018, while such the national figure was 11.8%. We also observe that the revenue from tourism has been a significant portion of the GDP in the XUAR. In 2018, the tourism revenue constituted 20.1% of the GDP. This figure was 26.7% in 2019.

The Belt and Road Initiative (BRI), or the One Belt and One Road (OBOR), was initiated in September 2013. It is considered one of “China’s greatest international economic ambition, aiming at stimulating economic development in a vast region covering sub-regions in Asia, Europe, and Africa, which accounts for 64% of the world population and 30% of world GDP” (Huang, 2016, p. 314). As one of the core regions of the BRI, it has been imperative for the XUAR to enhance its foreign trade.<sup>19</sup> The Urumqi Free Trade Zone was operationalized in 2017. The foreign trade, measured in the total value of imports and exports of operating units, has slowly recovered from the previous downturns.<sup>20</sup> Since Chen’s tenure, the amount of foreign trade has increased by 34.4% by the end of 2019. It was above the average foreign trade growth at the national level in the same period, which was 29.6%.

The rural development has focused on the targeted poverty alleviation. In 2017, the database of poverty household was established to facilitate the alleviation. In the same year, around 443,800 individuals and 311 villages were lifted out of the property.<sup>21</sup> In 2018, around 537,000 households, 513 villages, and two counties were no longer considered poverty by the standard at the end of the year. The poverty rate was reduced to 6.51%.<sup>22</sup> In 2019, 645,700 individuals, 976 villages, and 12 counties were lifted out of poverty. The poverty rate was 1.24%, and only 165,800 individuals were still classified as poor.<sup>23</sup> According to the official accounts, the persisting issue of dilapidated buildings was finally solved after renovations of 9355 households' homes in the same year.<sup>24</sup>

Given the pro-development economic policies during Chen's tenure, the XUAR was able to reverse the negative growth in GDP per capita in 2016, which has been able to remain on the steady growth since 2016.

## 2.2 | Maintenance of social stability

The other side of the post-2016 policies has emphasized the maintenance of social stability. It has been controversial due to the methods that were implemented. Chen, a soldier-turned-politician, has been coined as an ethnic policy innovator (Leibold & Zenz, 2017b). He is a pioneer of a series of new methods that control ethnic minorities in the region where he has presided.<sup>25</sup> In the XUAR, Chen's methods can be classified into two categories: massive surveillance and detainment.

The "grid-style social management" has been the core of the massive surveillance. In order to enhance such a social management method, the convenience police stations (CPSs) were established to monitor suspicious activities, especially the Uyghur population in each grid (Roberts, 2018). Although the state characterized these CPSs as a form of community policing, according to Leibold and Zenz (2017a, p. 17), these CPSs were "sophisticated concrete and bulletproof installing." On the "convenience" side, CPSs provide services like phone charging services, free newspapers, wheelchairs, umbrellas, etc. The "police" side of CPSs has the latest anti-riot equipment and high-tech surveillance equipment, which include facial and voice recognition software. The equipment enables CPSs to track down and build profiles of potential suspects (Leibold & Zenz, 2016). These CPSs are located across urban areas. Each is a few hundred yards from each other. Seven thousand five hundred new CPSs were established between August 2016 and July 2017.<sup>26</sup>

In order to staff each CPS, a cost-efficient police recruitment strategy was adopted. Under this recruitment system, while the numbers of regular police and special police units, who are better equipped and trained, remained limited, the recruitment of an underclass of less-trained assistant police was significantly expanded. This type of assistant police is paid less than regular police. In a single year, the region advertised 90,866 security positions; 95% of those jobs were assistant police associated with those newly established CPS's in the region. It was 12 times the number of positions advertised in 2009 after the Urumqi Riot (Leibold & Zenz, 2017a).

Under this surveillance system, the daily lives of residents in the region, including Han Chinese, have been frequently inspected by the authorities. IDs are required before purchasing of commercial goods such as gasoline, cellphones, and even sugar. These purchases are stored in databases to detect suspicious persons (Buckley & Paul, 2019).<sup>27</sup> Residents' communications are also frequently checked by the authorities. Cell phones are required to be regularly inspected for security reasons.<sup>28</sup> The usage of computers on college campuses is closely monitored as well. Some business owners are required to purchase metal detectors and hire security personnel.

There were also limitations on Uyghurs' mobility to complement the surveillance. In 2016, the regional authorities started to force Uyghurs to surrender their passports to the department of public securities for "safekeeping" (Wong, 2014).<sup>29</sup> In the southern part of the XUAR, people need to acquire written approvals from local officials to visit relatives in nearby villages (Roberts, 2018).

Under the limitation of mobility, there are other surveillance measures in rural areas to detect possible religious extremists (Roberts, 2018). Party officials are assigned to villages to monitor the Uyghur population. The most common way is by pairing local party officials with specific families. These officials would stay with families for some time to monitor the behaviors of those families. According to the state media, the method of pairing party officials with families "take the party's teachings to the grassroots," which would "fend off separatism, extremism" (Hou & Wang, 2016). In 2016, 200,000 party officials were paired with families in the rural areas of the XUAR.

These measures of intensive surveillance severely limited the free flow of laborers. Uyghurs across the region, especially those in urban areas, have been forced to return their home regions (Leibold & Zenz, 2017b). We observe a sharp decline in urban employment in 2018, which was an 8% drop from the previous year.

On the detainment side, Chen has escalated the measures of the internment camp, otherwise known as the reeducation camp, in the XUAR.<sup>30</sup> The purpose of these camps is “educating and rehabilitating people guilty of minor crimes or law-breaking and eradicating the influence of terrorism and extremism, in order to prevent them from falling victim to terrorism and extremism, and to nip terrorist activities in the bud” (SCIO, 2019: section 5). The region has started to widely apply the reeducation camps since 2014 as a part of the “striking hard” campaign (Zenz, 2018).

The scale of these camps reached unparalleled levels since Chen's tenure. In 2017, the Xinjiang Uyghur Autonomous Region Regulation on De-extremification was published by the XUAR government. One of the seven provisions articulated that the core of de-extremification is the prevention of religious extremists. The enhancement of reeducation camps is an essential component of prevention.<sup>31</sup> While there is no public data on the number of camps or detainees available, several scholars have made estimations based on official documents. According to the summary of Zenz (2018), 61 facilities related to the reeducation camps were built in the XUAR in 2017 through government procurement bids. Thum (Hayes & Thum, 2019) estimated that reeducation camps could hold “roughly a million, maybe high hundreds of thousands, maybe a little over a million people.”<sup>32</sup>

Prior to 2016, the public security expenditure had remained around 6% of the regional government's total expenditure. It had been lower than the general public service expenditure even after 2014, though it had always been higher than the national average level. After Chen became the party secretary of the XUAR, we observe a jump in the public security expenditure, which was a 91.6% increase from the previous year. Moreover, since 2017, the public security expenditure has surpassed the spending on the general public service and constituted more than 11% of the total regional government expenditure.

With a unique combination of these economic policies and maintenance of social stability, how has Chen's tenure affected the economic performance in the XUAR? Does the intensive maintenance of social stability dampen economic performance?

## 2.3 | The structure of public finance in the XUAR<sup>33</sup>

Before we proceed to the next section, we want to discuss how the XUAR has financed the expenditure of Chen's ethnic policies.

Public finance in China features a tax-sharing system. Tax revenue is generated from the central tax, the local tax, and the shared tax. The central tax included taxes that are critical to the wellbeing of national interests and the implementation of macroeconomic regulations. For example, customs duties, excise tax, and financial market tax are central taxes. The share taxes are taxations related to general economic development. These include value-added taxes, individual income taxes, and corporate taxes. The local taxes include taxations that fit local management and collections and enhance local tax revenue. Land taxes and property taxes are some examples of local taxes. The central government controls the legislative authority of the tax system to unify national orders and a unified national market. The tax system also decentralizes the expenditure authority. Local governments are responsible for local management costs, such as public security and local public health expenditures.

Under the tax-sharing system, the central government can transfer revenue from wealthier regions (provinces in eastern China) to less developed regions to finance regional public expenditure. How much government transfer payment each region would receive depends on the regional fiscal self-sufficiency ratio.<sup>34</sup> In general, regions with a ratio that is below 70% would need support from the central government to finance their local expenditure. The lower the ratio a region has, the higher level of dependency on the central government's transfer payment. The XUAR has often been at the bottom quartile in the rank of fiscal self-sufficiency ratio since 2002.<sup>35</sup> This indicates that the region has received a significant amount of transfer payments from the central government to finance approximately 66%–70% of the annual regional expenditure since Chen's tenure.

## 3 | EMPIRICAL METHOD

### 3.1 | Method

We use the synthetic control method (SCM) as a way of measuring the impact that Chen had on Xinjiang's economy and social coercion upon taking reign of the region. Ideally, we would want to know what happened in 2016 and beyond with Chen and without Chen as a leader. In this case, however, it is clear that we cannot observe both Xinjiang without

Chen and Xinjiang with Chen in power. On a similar note, randomly assigned leaders to regions might be a way of addressing causal impacts. However, Chen was appointed by the CPC, hence we would be dealing with endogeneity if we simply examined the change in results after he was put in charge of the region. The SCM provides a way to estimate a pre-treatment Xinjiang, though. The SCM creates an algorithmic-based counterfactual unit that is similar to the treated unit in every way except for the treatment (Abadie et al., 2010; Abadie & Gardeazabal, 2003). This generated counterfactual is a weighted average of control units based on its ability to predict pre-treatment Xinjiang. Additionally, predictor variables are also weighted based on their ability to predict pre-treatment Xinjiang.

One of the first steps in running the SCM is to find a group of donors that could potentially contribute weight to the counterfactual. Most importantly, these donor units could not receive the same treatment because including those units could bias the results. There is a trade-off between overfitting with too many regions in the donor pool and unintentionally biasing your sample by removing potentially important regions. We follow the work on Zhou (2018) by using all of the regions in Mainland China.<sup>36</sup> We do, however, exclude Tibet and Hebei. We exclude Tibet because Chen was the party secretary of that region before his reign in the same position in the XUAR. While Chen was only governor of Hebei, and therefore lower ranked than party secretary, we exclude this region out of caution.

By using the SCM, we are finding an unequally weighted combination of donor regions.<sup>37</sup> This is preferred to using only one region as a point of comparison because it allows us to achieve a better pre-treatment fit. This means we are more accurately predicting Xinjiang before the treatment, and thus can get a better sense of the causal impact of the treatment. For example, if we used only Xinjiang's highest donor weight contributor for GDP per capita, Qinghai, we achieve a pre-treatment fit (measured by RMPSE<sup>38</sup>) of 1903.45, as opposed to 552.82 when using the entire donor pool. Guangdong is our region's biggest weight contributor when assessing the arrest rate. When only using Guangdong for creating a synthetic examining the arrest rate, the RMPSE is 3.123; under the full donor pool, we achieve a RMPSE of 2.174. By using such a method that allows for different weights, we can better get a picture of a true counterfactual Xinjiang, a necessary condition for assessing causality.

## 3.2 | Inference

As is the case in any method, some assumptions must be made. Lawson et al. (2019) point to two main assumptions about the SCM needed to claim causal inference. The first assumption is that the effects we see post-treatment are only due to the treatment. While the SCM itself cannot directly prove this, we believe that this is likely the case because the CPC specifically appointed Chen in the hope that he would facilitate the economic growth, while maintaining the social order in the XUAR (Hou & Wang, 2016). Next, we must also ensure that the treatment did not impact any other units in our donor pool. We address this by removing Tibet and Hebei from the donor pool. Additionally, due to the XUAR having a high population of Muslim citizens, we argue that other regions were not truly affected by Chen's social stability policies.

After running the synthetic, we want to know if the difference between the treated and its synthetic counterfactual is truly significant. Following Abadie et al. (2010), we use a permutation test to find an associated  $p$ -value with our results. This is done so by "giving" each unit in our donor pool the treatment and comparing the post-estimation results. Since these regions did not receive the treatment, we would expect the results from Xinjiang to be larger than our control units shown by receiving a low  $p$ -value.  $p$ -values in each post-treatment period is the percentage of regions with a higher ratio of post-treatment RMSPE by pre-treatment RMSPE. A high  $p$ -value would suggest that our results are not significant, implying that the treatment did not impact Xinjiang. This is done for each of our three post-treatment periods, as well as a combined  $p$ -value for the entire post-treatment period.

## 4 | DATA

### 4.1 | Outcome variables

We are concerned with the trade-off that Chen's reign faced between economic development and social stability. Such a ruler might sacrifice economic well-being over the well-being of the society. Rulers with this level of autonomy might be able to maximize one particular measurement (Berdine et al., 2018a, 2018b; Bologna Pavlik & Geloso, 2020). In this

case, the background information leads us to believe that it is more likely that Chen viewed social coercion over economic success. To test this hypothesis, we measure the effect of his tenure as a leader on economic and crime outcomes.

For economic outcomes, we measure if his reign led to an increase in GDP per capita. This data comes from the National Bureau of Statistics of China (NBSC) and is available from 1999 to 2018. Zhou (2018) used this same measurement to study the impact of an institutional shock on Chongqing. To measure social coercion, we utilize two different measurements from the Procuratorial Yearbook of China and the NBSC. The first is the approved arrest rate per 10,000 from 2007 to 2018. Higher arrest rates, in this case, would likely signify a polity cracking down on crime as a way of generating greater societal compulsion. Similarly, we include expenditures on public security for 30 regions from 2007 to 2018. If the synthetic shows that Chen's tenure led to a larger jump in this type of government spending, this would suggest a heavy emphasis being placed on creating a more unified society.

## 4.2 | Predictor variables

We can include predictor variables (other than just lagged values of the outcome) in order to generate a counterfactual that is similar to the treated unit on other margins. Following Zhou (2018), we include investment asset share, industry share, construction share, consumer price index (CPI), and foreign trade as a percentage of GDP. For social coercion measures, we include the post-secondary education ratio, the age dependency ratio, and GDP per capita. For social coercion outcomes, we wanted to consider both the demographic features (age dependency ratio) and education levels (post-secondary education ratio).

In each specification, we include lagged outcome variables as well. Ideally, one would include every lagged year in order to achieve a close-to-perfect fit. However, doing so would leave no weight for the other predictor variables (Kaul et al., 2016). There is a trade-off between pre-treatment fit and weights being assigned to other variables. When examining GDP per capita, we include two lagged values: the average GDP per capita from 1999 to 2007 and the average GDP per capita from 2008 to 2015. For our two social coercion variables, we only include the average from 2007 through 2015 values. The summary statistics of the variables, split up by Xinjiang and the donor pool regions, can be found in the appendix (Table A1).

## 5 | RESULTS

We examine three different outcomes in this study. In each synthetic control analysis, we compare the post-treatment results of Xinjiang in comparison to its generated counterfactual. We first consider the case of the Chen regime on economic development, measured by GDP per capita. We secondly focus on the level of social stability and coercion that became a chief focus of the Chen administration.

### 5.1 | Economic development

We compare Xinjiang and its generated synthetic with respect to GDP per capita in Figure 1. We achieve a great pre-treatment fit, and there is little difference between synthetic and actual Xinjiang post-treatment, with Xinjiang's GDP per capita being slightly lower than the counterfactual. Table 1 reports the indicator fit for this analysis, and Table 2 reports the donor weights that contributed to the synthetic. We achieve great fit for each predictor variable.

Our synthetic is largely comprised of Yunnan (36%), Ningxia (23.1%), Qinghai (13.6%), and Gansu (10.1%). Three other provinces (Shanghai, Hainan, and Heilongjiang) contribute less than 10% each.<sup>39</sup> Figure 2 report the results from the permutation test where we (falsely) give each unit in the donor pool the treatment. Incomes appear to be lower in all 3 years, with the gap closing in each subsequent year. However, the  $p$ -values associated with each individual year are not significant. This is also shown through a “placebo  $p$ -value” in Table A2. Overall, it appears that Chen's regime, at least in the 3 years since his tenure began, has not impacted incomes in any significant manner. The overall significance is quite low as well (0.808).

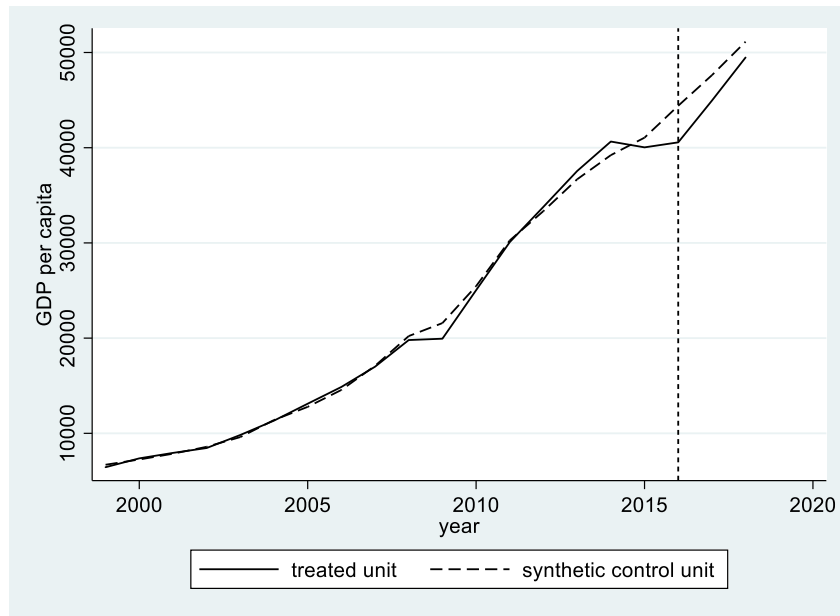


FIGURE 1 Baseline synthetic (GDP per capita)

TABLE 1 Indicator fit (GDP per capita)

Indicator variable	Xinjiang	Baseline	Dropping Yunnan
GDP per capita (1999–2007)	10,706.67	10,648.55	10,458.8
GDP per capita (2008–2015)	30,861.63	30,978.92	31,048.04
Investment asset share	64.754	64.666	64.688
Industry share	35.113	35.168	35.087
Construction share	18.197	18.206	18.184
Foreign trade share	20.200	20.455	20.211
CPI	102.365	102.406	102.262
RMPSE	-	663.330	695.320

Note: Unless otherwise specified, the indicator variables are averaged from 1999 to 2015.

## 5.2 | Coercion and enforcement

We next turn our attention to Chen's impact on coercion and enforcement in the form of approved arrest rates (per 10,000). Visually, we find a significant jump post-treatment on arrest rates (Figure 3). We achieve a decent pre-treatment fit with respect to the arrest rate and for many of the indicator variables (Table 3). For instance, the synthetic's industry share is over 3% points higher than Xinjiang and the post-secondary education ratio is over three points higher. Four provinces contribute weight to synthetic Xinjiang: Qinghai (44.4%), Guizhou (35.9%), Guangdong (12.6%), and Zhejiang (7.1%) (Table 4).<sup>40</sup>

Despite this imperfect pre-treatment fit, the permutation test will allow us to account for this. Poor pre-treatment fits are “punished” by using the standardized  $p$ -values. Given that our pre-treatment fit was not great, the post-treatment effects must be quite substantial if we are expected to find a low  $p$ -value. This appears to be the case (Figure 4). The standardized  $p$ -value is 0.036 overall (Table A2), suggesting that despite the somewhat poor pre-treatment fit, the post-treatment effects were substantially larger than the other provinces. We can confidently consider this to be greatly significant. The gap is highest in 2017, with Xinjiang having arrest rates of 88.16 per 10,000 higher than the synthetic.



TABLE 2 Donor weights (economic outcomes)

Region	GDP per capita	
	Baseline	Dropping Yunnan
Anhui		
Beijing		0.5%
Chongqing		
Fujian		
Gansu	10.1%	43.2%
Guangdong		
Guangxi		
Guizhou		
Hainan	4.4%	5.2%
Heilongjiang	4.3%	6.2%
Henan		
Hubei		
Hunan		6.5%
Inner Mongolia		
Jiangsu		
Jiangxi		
Jilin		
Liaoning		
Ningxia	23.1%	30.8%
Qinghai	13.6%	
Shaanxi		
Shandong		
Shanghai	8.5%	7.5%
Shanxi		
Sichuan		
Tianjin		
Yunnan	36%	-
Zhejiang		

Next, we run the synthetic on public security spending as a percentage of GDP (Figure 5). The divergence seems to occur earlier than the treatment, but post-treatment, the difference diverges even greater. We achieve fairly sound pre-treatment fit for five of the nine variables, but we do not achieve a great fit for investment asset share, construction share, foreign trade share, and post-secondary education ratio (Table 5). Three provinces contribute weight to the synthetic: Qinghai (73.9%) is again the highest, followed by Hainan (25.2%) and Beijing (0.9%) (Table 4).<sup>41</sup>

The permutation tests suggest a significant difference from the treatment. However, the post-treatment divergence was discounted by the poor pre-treatment fit. The overall  $p$ -value is only 0.148, suggesting that this divergence was not truly significant (Table A2). Visual examination reveals a similar story (Figure 6). Overall, this analysis reveals that Chen did not significantly impact the development of the region, but instead had a much greater impact on coercion and enforcement. Again, it is important to note that the public safety spending variable, which suggests large differences, was not statistically significant.<sup>42</sup>

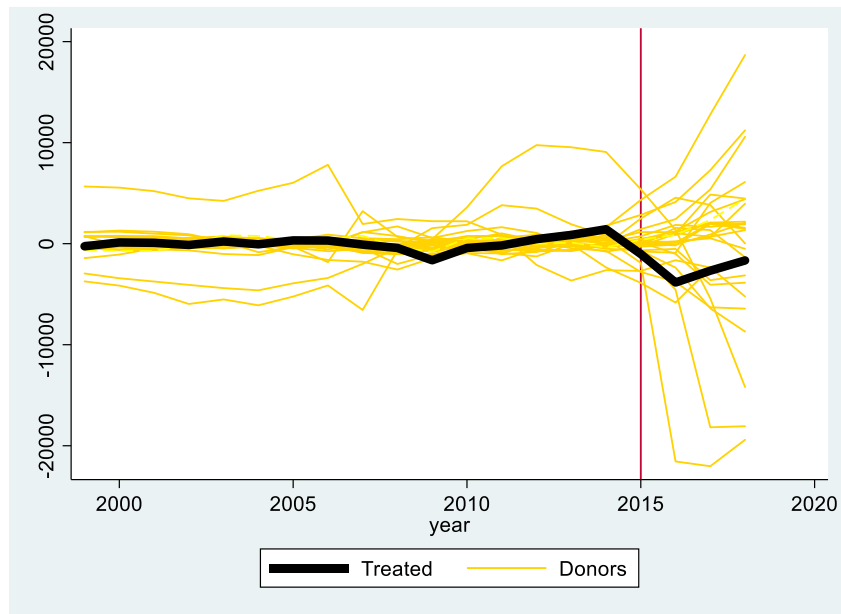


FIGURE 2 Placebo comparison (GDP per capita)

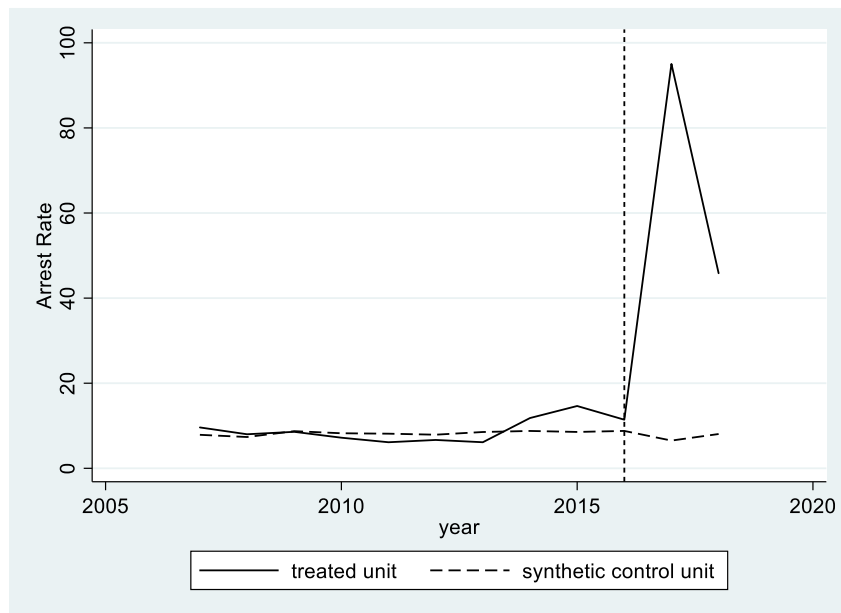


FIGURE 3 Baseline synthetic (arrest rate)

While Abadie et al. (2010) uses the root mean square prediction error (RMSPE) to measure pre-treatment fit, Adhikari and Alm (2016) propose a pretreatment fit index. Their fit index is advantageous for comparing fit when there are multiple treated units or when one uses different outcome variables, with the latter case being more relevant for the purposes of this paper. This index is the ratio of observed RMSPE and the “benchmark” RMSPE, where this benchmark is based on a zero-fit model. A score of 1 indicates that RMSPE and the benchmark are equal, with a score of 0 suggesting a perfect fit. We calculate this fit index for the three outcome variables in our baseline analysis. For GDP per capita, the pre-treatment fit index is 0.03, which is our best fit of the three. With respect to the arrest rate and public safety spending, the pre-treatment fit index is 0.29 and 0.11, respectively. This tells that we achieve a better pre-treatment fit for GDP per capita than our social coercion measures.

TABLE 3 Indicator fit (arrest rate)

Indicator variable	Xinjiang	Baseline	Dropping Guangdong
Arrest rate	8.756	8.236	8.758
GDP per capita	29,321.33	29,321.73	39,626.71
Investment asset share	76.585	75.465	68.639
Industry share	36.952	40.045	36.204
Construction share	19.751	17.896	19.753
Foreign trade share	22.528	22.509	39.608
Post-secondary education ratio	12.001	8.641	12.005
Age dependency ratio	38.300	40.639	38.291
CPI	103.878	103.876	103.82
RMPSE		2.630	2.713

Note: Unless otherwise specified, the indicator variables are averaged from 2007 to 2015.

### 5.3 | Robustness test: Restricting the donor pool

As we mentioned in Section 3.1, we run the risk of overfitting our model by including too many provinces in the donor pool. In this subsection, we restrict the donor pool in three manners to address this specific problem. Specifically, we first only include regions that are in the Northwest area of Mainland China.<sup>43</sup> It could also be the case that this is too restrictive, so we also include regions in the Southwest area as well.<sup>44</sup> Finally, we include only the provinces who are also autonomous regions, as they are given relatively more self-regulatory rights.<sup>45</sup>

Figure B1 reports the results from our three outcomes variables when only using provinces in the Northwest region. We achieve a much worse pre-treatment fit with excluding the other provinces in Mainland China. It is hard to state anything conclusive in this figure due to the fit. The arrest rate fit looks very similar to our baseline (see Figure 3). When we examine public safety spending, however, the divergence occurs almost immediately once the pre-treatment period begins. Overall, we get very similar results from our baseline, but with worse pre-treatment fits.

Next, we include the Southwest region of China as well (Figure B2). By including more regions, our figure looks more similar to our baseline. This is especially true for our arrest rate synthetic, which now has a fit only slightly worse than our baseline figure. The GDP per capita is similar to both our baseline and robustness check analyses, suggesting that these results are quite robust to alternative specifications.

Finally, we also restrict the donor pool to the other three autonomous regions (Guangxi, Inner Mongolia, and Ningxia). These results are found in Figure B3. Overall, the results do not change, as we find no significant difference in GDP per capita, but much higher arrest rates. We achieve a quite poor pre-treatment fit for public safety spending, again.

### 5.4 | Robustness test: In-time placebo and different predictor variables

As is common in synthetic control papers, we run an “in-time” placebo test, where we (falsely) give the treatment before the treatment actually occurred. For this study, we pretend the treatment happened in 2013. This test is reported in the appendix (Figure C1). For GDP per capita, we find no difference post-treatment between the synthetic and Xinjiang. However, divergence occurs post-treatment for arrest rate and public safety spending. With respect to the arrest rate, six more arrests per 10,000 occurred post-treatment. This is concerning for our analysis since this divergence occurred before Chen’s arrival in Xinjiang. However, this is not too surprising given the strike hard campaign put into place in 2014 in response to protests in the region. While this brings into question the main analysis to some extent, we do point out that the divergence is *much larger* after 2016. Arrest rates are 88 persons per 10,000 higher than the synthetic in 2017, and 38 persons per 10,000 higher in 2018. Public safety spending diverges long before even the “false” 2013 treatment year, bringing further into question this measurement. We cannot confidently say that public security spending went up due to Chen and the CCP’s policies in 2016.

TABLE 4 Donor weights (social compliance outcomes)

Region	Arrest per 10,000		Public safety spending (% GDP)	
	Baseline	Dropping Qinghai	Baseline	Dropping Qinghai
Anhui				
Beijing			0.9%	
Chongqing				
Fujian				
Gansu				
Guangdong	12.6%	2.9%		
Guangxi				
Guizhou	35.9%	30.1%		33.3%
Hainan			25.2%	66.7%
Heilongjiang				
Henan				
Hubei				
Hunan				
Inner Mongolia				
Jiangsu				
Jiangxi				
Jilin				
Liaoning				
Ningxia		40.8%		
Qinghai	44.4%	-	73.9%	-
Shaanxi				
Shandong				
Shanghai		21.8%		
Shanxi				
Sichuan				
Tianjin				
Yunnan				
Zhejiang	7.1%	4.4%		

Another potential issues with synthetic control can occur if you “cherry pick” your model (Ferman et al., 2020). The aforementioned study explains that due to a lack of guidance in choosing matching variables, scholars run the risk of misleading readers by choosing to report only the model that fits their narrative. In this subsection, we report figures using two different predictor variables. When we examine GDP per capita, for example, we include two lagged outcomes (2007 and 2015) instead of two lagged outcome averages. In our second analysis, we also exclude trade per capita due to not achieving a good pre-treatment fit. The results of these figures can be found in the appendix (Figure C2). In neither case do we get a better pre-treatment fit, but we do find similar results. The synthetic units outperform actual Xinjiang in both of these analyses.

We now do the same on arrest rates (Figure C3). The figures look identical, suggesting that removing trade per capita did not change the analysis. Finally, our public security spending variable comes out similar to our baseline (Figure C4). It appears that all three analysis reveal analogous results.

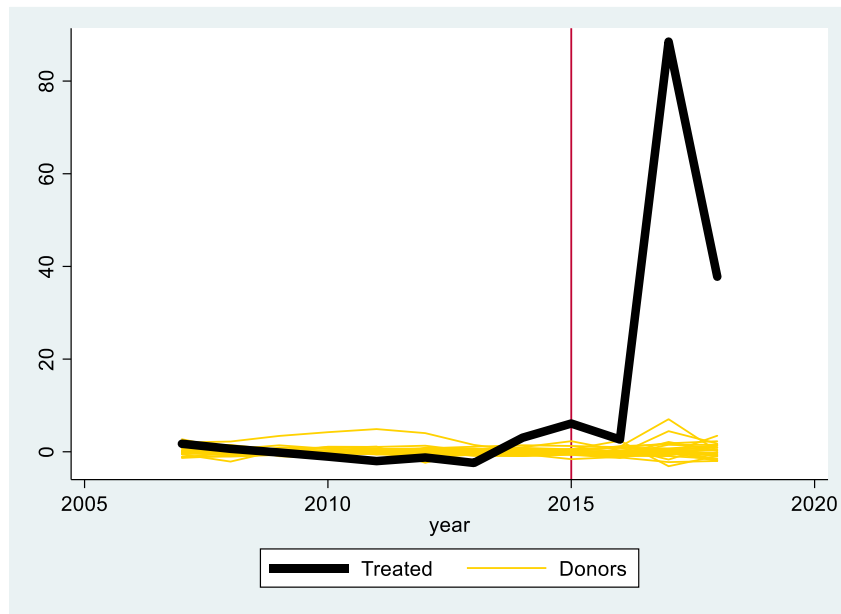


FIGURE 4 Placebo comparison (arrest rate)

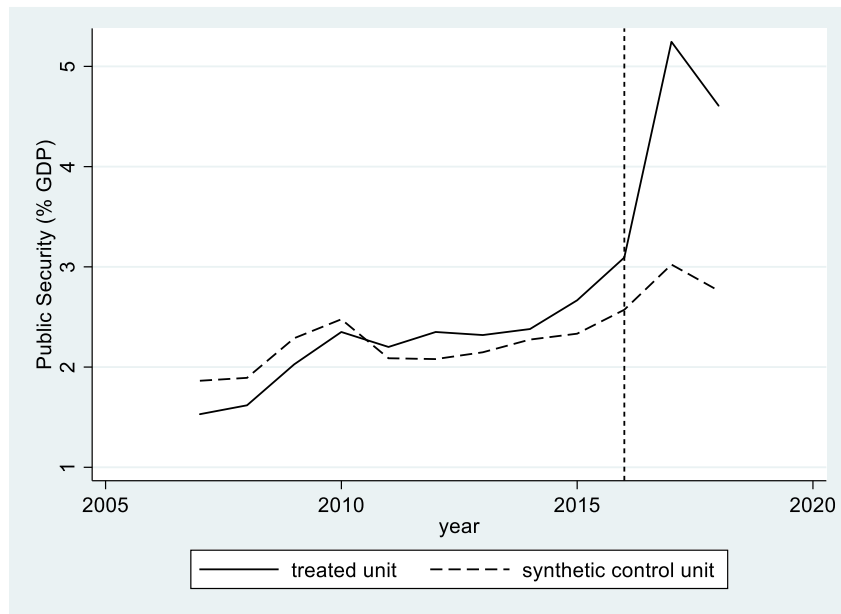


FIGURE 5 Baseline synthetic (public security spending as % of GDP)

### 5.5 | Robustness test: Dropping all donors with weights

While we dropped the highest contributing province earlier in the paper, we want to account for potential overfitting to the best of our abilities. In this section, we drop *all* provinces (one at a time) that provided positive weights to the synthetic. This is done to ensure that we are not reliant on just one province or a small handful to yield our results.

We start with GDP per capita (Figure D1). We drop the other five provinces once here and reveal no substantial change in the results. In each case, GDP per capita is slightly higher for the synthetic than the treated unit; however, the

TABLE 5 Indicator fit (public safety spending share)

Indicator variable	Xinjiang	Baseline	Dropping Qinghai
Safety spending share	2.160	2.161	1.973
GDP per capita	29,321.33	28,904.66	24,527.19
Investment asset share	76.585	84.676	70.949
Industry share	36.952	36.957	22.718
Construction share	19.751	15.610	10.594
Foreign trade share	22.528	11.526	19.507
Post-secondary education ratio	12.001	9.525	7.580
Age dependency ratio	38.3	37.952	42.486
CPI	103.878	104.464	103.456
RMPSE	-	0.238	0.295

Note: Unless otherwise specified, the indicator variables are averaged from 2007 to 2015.

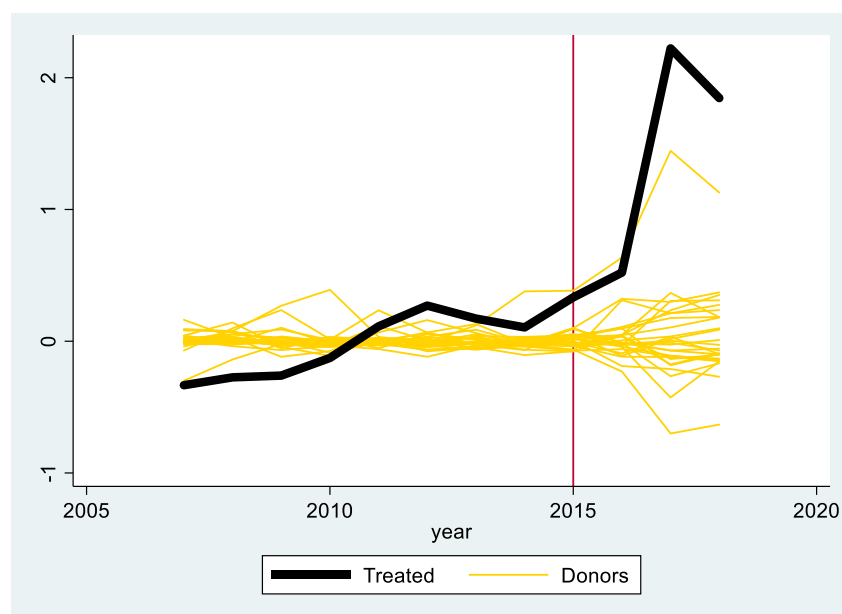


FIGURE 6 Placebo comparison (public safety spending)

gap is modest. We do not find any major differences from our main results with respect to the arrest rate once we drop the three other provinces that contributed weight to our baseline analysis (Figure D2). The same is true for the two other provinces that contributed to the public safety spending (Figure D3).

## 5.6 | Robustness test: Analyzing Chen's tenure in Hebei and Tibet; using only lagged outcomes

As one of the final robustness tests, we analyze the impact of Chen's tenure in Hebei as governor (2009–2011) and Tibet as party secretary (2011–2015) on these outcomes. We do note that governor ranks lower than party secretary, so his impact on Hebei should be lower. Furthermore, our coercion and enforcements measures do not begin until 2007, so we cannot run any acceptable synthetic for Hubei for these measures, since we would only have 2 years of pre-treatment data.

We do, though, still consider GDP per capita for Hebei (Figure E1). There is no divergence between the Hubei and the synthetic. We now examine Tibet, which is closer to the situation in Xinjiang because he held the same position in the two provinces (Figure E2). However, only when examining GDP per capita do we find a pre-treatment fit. Here, we find no difference. For our coercion and enforcement variables, the fit is not proper so we cannot take anything satisfactory from this.

Finally, we run the baseline experiment, but only include lagged outcome variables (Figures F1–F3). The results look mostly the same from the baseline analysis, although the donor weights did change a good bit. For example, for the GDP per capita experiment, now every region contributed some weight to the synthetic. This usually occurs because the algorithm is having a difficult time creating a close counterfactual, suggesting the benefits of including other predictor variables. As Abadie (2021, p. 407) points out, sparsity in the number of donor regions that provide weights to the counterfactual is one of the major advantages to synthetic control over regressions. This advantage is both geometrically, as well as in ease of interpretability.

## 6 | CONCLUSION

We evaluate Chen and the CPC's policies on the XUAR via applying the SCM. Chen and the CPC implemented a bundle of policies that sought to improve incomes *and* institute more social coercion to the area. It appears as though the policies had a larger impact on social coercion (arrest rates and higher spending on public security) with no substantial impact on incomes. Amidst the recent deteriorating relationship between China and the United States, followed by the sanction of top officials of the XUAR, it is worthwhile to keep tracking both the political and economic development in the XUAR for the rest of Chen's tenure as the party secretary.

Chen's appointment in the XUAR made him the only person who has served as the party secretary in two different ethnic minority autonomous regions. Since 2002, it has become the implicit rule that the party secretary of the XUAR has also been selected as a member of the Politburo of the CPC. Member status in Politburo means the party secretary is one of the 25 top officials of the CPC in the country. One year after his appointment, Chen became a member of the Politburo. It has been speculated that Chen's tenure as the party secretary of the XUAR will enable his path to become one of the seven members of the Politburo Standing Committee in 2022.

Our findings suggest that, despite seeking to bring about an economic transformation by implementing heavy social coercion measures, Chen and the CPC's policies in the region actually did more harm than good. This is not only an issue of regional development but of basic human rights. We believe our findings bring to the forefront the importance that leaders can have on the outcomes of citizens, especially those in vulnerable positions.

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## ENDNOTES

- <sup>1</sup> The sanction will freeze Chen's assets in the United States and bar his immediate relatives and himself from entering the United States.
- <sup>2</sup> The other four are Guangxi Zhuang Autonomous Region, Inner Mongolia Autonomous Region, Tibet Autonomous Region, and Ningxia Hui Autonomous Region.
- <sup>3</sup> Before his governorship, Chen was one of the deputies of Li Keqiang, the current prime minister of China, when Li was the governor of Hebei.
- <sup>4</sup> Our identification strategy, the synthetic control method, seeks to estimate what would have happened had Chen *not* taken over XUAR. We cannot disentangle between the effects of pro-market reforms and state-led coercions.
- <sup>5</sup> Absher et al. (2020) generalize and confirm these findings to measure the impact of other left-populist regimes in Latin America.

- <sup>6</sup> Specifically, they found that their generated counterfactual had lower infant mortality rates than actual Cuba in the first 3 years post-treatment. Cuba and the generated counterfactual only reach similar rates of infant mortality a decade after the revolution.
- <sup>7</sup> According to Chen (2006), there are four arenas that constitute to the maintenance of social stability: the political, the economic, the public security, and the cultural. The political arena includes the degree political consensus among citizens, the effect of corruptions, the degree of long-lasting legacy of the previous political institution, and the incitement from the foreign hostile forces to destabilize the country. The economic arena includes the redistribution of wealth, the completeness of the market economy system, and the gap between rich and poor. The public security arena the institution of social management. The cultural arena includes the conflicts that are caused by cultural diversity, and the management of the religious diversity.
- <sup>8</sup> SCIO also explicitly stated that terrorism endangers every arena that constitutes to the social stability in the XUAR.
- <sup>9</sup> Clarke (2008) argued that there were errors in the estimation of incidents since it was questionable to classified some of those events as “terrorist attacks.” He suggested that there were also computation errors regarding the total casualties from those incidents. Roberts (2018, forthcoming) also questioned about classifying violent activities as terrorism attacks in the 1990s.
- <sup>10</sup> There were also Uyghur-related violent incidents outside of the XUAR. These incidents include the Tiananmen Square suicide attack in 2013, the Kunming railway station attacks in Yunnan province in 2014, and two Guangzhou railway station attacks in Guangdong province.
- <sup>11</sup> [http://www.gov.cn/xinwen/2014-05/25/content\\_2686604.htm](http://www.gov.cn/xinwen/2014-05/25/content_2686604.htm).
- <sup>12</sup> These policies are also part of the “1+3+3+reform and open” initiative in the XUAR. “1” means that the anti-terrorism must be the highest (“number one”) priority. It is the foundation of the initiative. The first “3” means “three major battles”. These “battles” include the areas of prevention of financial risk, targeted poverty reduction, and pollution control. The second “3” means the solidification of the core economic zone in the Belt and Road Initiative, the revival of the rural area, and the development of tourism in the XUAR. These would contribute to the facilitation of high-quality development.
- <sup>13</sup> We gathered these data from both NBSC and the Statistic Bureau of Xinjiang Uyghur Autonomous Region, the Statistical Bulletin of Economic and Social Development.
- <sup>14</sup> It was called “integrating 12 licenses into one” in the XUAR in 2017.
- <sup>15</sup> Prior to 2018, the tax administration was divided into two branches, the local tax administration and the state tax administration. These two branches were integrated into one in the major institutional reform of 2018. The market regulation administration was previously known as the General Administration of Quality Supervision, Inspection and Quarantine.
- <sup>16</sup> According to the estimation, the length of acquiring a business license was reduced to only 10 days on average. This figure was 30 days before the reform.
- <sup>17</sup> The quality of tourist attractions and scenic areas is based on a rating system of the Ministry of Culture and Tourism (it was divided into Ministry of Culture and National Tourism Administration prior to 2018) in China. The rating of 5A means the most important and best-maintained tourist attraction in China. The XUAR has the most 5A natural scenic areas among other provinces.
- <sup>18</sup> <http://cpc.people.com.cn/n1/2018/0827/c64094-30253825.html>.
- <sup>19</sup> The Annual Report of the Xinjiang Uyghur Autonomous Region People’s Government 2017.
- <sup>20</sup> The foreign trade had a significant drop in 2015 after the Strike Hard campaign. It experienced another year of negative growth in 2016.
- <sup>21</sup> <http://fpb.xinjiang.gov.cn/xjfp/fptjtc/201805/72205a417269462a842b07c05b9c40cb.shtml>.
- <sup>22</sup> The Xinjiang Uyghur Autonomous Region’s Statistical Bulletin of Economic and Social Development 2018 (2019).
- <sup>23</sup> The Xinjiang Uyghur Autonomous Region’s Statistical Bulletin of Economic and Social Development 2019 (2020).
- <sup>24</sup> The Annual Report of the Xinjiang Uyghur Autonomous Region People’s Government 2019.
- <sup>25</sup> Prior to his tenure, there had been continuous unrests that threaten CPC’s influence in the TAR. A major violent incident erupted in 2008 that involved the deployment of troops. Since Chen’s tenure as the party secretary of the TAR in 2011, the social stability had been restored and there had been no major violent incidents. Only eight self-immolations, which is a form of protest, were observed after 2012.
- <sup>26</sup> The provincial capital, Urumqi, has new 949 CPSs. One of the four major prefectures in the southern XUAR, Hetian, has 1130 CPSs.
- <sup>27</sup> [https://www.nytimes.com/2019/05/22/world/asia/china-surveillance-xinjiang.html?\\_ga=2.29508031.1467067295.1592850218-1693405136.1591916290](https://www.nytimes.com/2019/05/22/world/asia/china-surveillance-xinjiang.html?_ga=2.29508031.1467067295.1592850218-1693405136.1591916290).
- <sup>28</sup> <https://www.bbc.com/zhongwen/simp/press-review-41999212>. Also see the discussion in Devereaux and Peng (2020) on how smart-phones reduce the cost of surveillance by the state.
- <sup>29</sup> <https://www.nytimes.com/2016/12/01/world/asia/passports-confiscated-xinjiang-china-uyghur.html>.
- <sup>30</sup> It’s official named Vocational Education and Training Centers by the CPC (SCIO, 2019).
- <sup>31</sup> People’s Daily, 2017, <http://xj.people.com.cn/n2/2017/0330/c186332-29942874.html>.
- <sup>32</sup> <https://www.nbcnews.com/think/opinion/uncovering-china-s-secret-internment-camps-rian-thum-podcast-transcript-ncna998116>; <https://www.govinfo.gov/content/pkg/CHRG-115hrg30993/html/CHRG-115hrg30993.htm>.



- <sup>33</sup> We thank the editor for suggesting adding a discussion of the structure of public finance in China. The paper benefits greatly from this discussion of the public finance structure.
- <sup>34</sup> It is a ratio that is used in order to evaluate if a region is able to generate enough revenue to cover its expenditure. A higher revenue to cost ratio indicates a higher level of fiscal self-sufficiency.
- <sup>35</sup> The ratio was below 35% in most years and below 30% in several years since 2002.
- <sup>36</sup> As a robustness test, we run our analysis using only regions in Northwest China.
- <sup>37</sup> The weights of the donor pool are restricted to be nonnegative and sum up to one.
- <sup>38</sup> The RMPSE, or the root square prediction error, is used as a “goodness of fit” measurement for the pre-treatment periods.
- <sup>39</sup> As a point of robustness, we exclude the largest weight contributor (Yunnan) with the figure being shown in the appendix (Figure A1). This is done to ensure that one area is not driving our entire results. It does not seem that Yunnan was driving the results heavily, as we end up with roughly the same picture as before.
- <sup>40</sup> Dropping Qinghai does not change the results substantially (Figure A2).
- <sup>41</sup> Dropping Qinghai leaves us with a worse pre-treatment fit, but the post-treatment effect still seems to show a substantial increase in spending after Chen entered office (Figure A3).
- <sup>42</sup> We compare the mean and standard deviations of the outcome variables for all three baseline analyses in the appendix (Table A3). Here, Xinjiang, the entire donor pool, and the created counterfactuals are compared. The means and standard deviation between Xinjiang and the entire donor pool are quite unsimilar, as expected. However, we note that the mean and distribution of Xinjiang with the generated counterfactuals are almost equivalent. For GDP per capita, the synthetic's mean is over \$500 lower than Xinjiang (or 3% of Xinjiang's average GDP per capita), and the standard deviation is quite lower than that of Xinjiang. For arrest rates and public safety spending, though, the mean and standard deviation are exactly the same.
- <sup>43</sup> Along with our treated province, Xinjiang, this region includes Ningxia, Qinghai, Gansu, and Shaanxi.
- <sup>44</sup> Yunnan, Guizhou, Sichuan, and Chongqing are in this region. Tibet is also part of the Southwest region but is excluded due to Chen's being a leader in the region before taking over Xinjiang.
- <sup>45</sup> These provinces include Guangxi, Inner Mongolia, and Ningxia.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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