The University of Chicago

Consequences of the US-China Trade War on the US Agriculture Industry: Evidence of Intra-industry Fragmentation

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June 2021

A paper submitted in partial fulfillment of the requirements for the Master of Arts degree in the Master of Arts Program in the Committee on International Relations

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Abstract

The majority of existing literature in trade politics finds support for the firm centric model in the manufacturing sector. Therefore, less is known about how preferences for trade policy are formed in other sectors of the economy, especially the agricultural sector. Using Political Action Committee (PAC) contribution data, this paper looks at how party preferences of US agricultural interest groups change before and after the onset of the US-China trade war. The two main findings of this paper are as follows: 1) PACs prior to the outbreak of the US-China trade war in 2016 were fairly unified in their political preferences with most donations going to the Republican party but from 2018 to 2020, preferences become highly variegated; 2) more profitable, exporting farms were more likely to shift their support to the Democratic party, while the less profitable, import-competing farms were more likely to continue supporting the Republican party. These findings are suggestive of two important facts. First, agricultural interest groups punish parties for implementing trade policies that harm their industry by giving less contributions. Second, the firm centric model holds in the US agriculture sector but only under certain circumstances where great harm has been inflicted on the agribusinesses.

I. Introduction

The US-China trade war initiated on March 2018 with President Trump imposing tariffs on Chinese imports. Chinese retaliatory tariffs that followed President Trump's measures were predominantly targeted at agricultural goods, inflicting immense harm on the US agriculture sector. In fact, farmers petitioned to remove US tariffs on Chinese imports, claiming to have been severely harmed by the ongoing trade war, both from the retaliatory tariffs imposed on their agricultural exports and also from the increased costs of imported farm auxiliaries such as fences and feedstuffs that are essential for maintaining their business. With all the harm that it has done to the US farmers, the US-China trade war offers a unique opportunity to study the distributional effects of trade on the agriculture sector. In this paper I examine the transformation of political preferences among US agriculture groups in the wake of the US-China trade war and find evidence of intra-industry fragmentation in trade preferences.

Despite the vast literature on firm centric model of trade preferences, past studies in this field have mostly derived their evidence from the manufacturing sector. Thus, less is known about how the model applies to other sectors of the economy. My current research serves to contribute to the existing literature on trade preferences by shedding light on the US agriculture sector. The US agriculture sector is distinct from the manufacturing sector in that farms typically do not engage in FDI and the products are not as variegated. A more striking discrepancy between the two sectors is the unified political ideology among the US agriculture sector – US farm groups have long been staunch supporters of the conservative party. Based on the observed discrepancies, I argue that the firm centric model holds in the US agriculture sector but only under certain circumstances where great harm has been inflicted on the agribusinesses.

I use the PAC contribution data available on opensource.org and state level farm statistics retrieved from the 2017 Census of Agriculture to test my predictions. My argument is supported by the observation of shifts in political contribution after the onset of the US-China trade war. I also show evidence that more productive farms incur losses by closing off trade and thus are more opposed to protectionist policies, which is represented by their shift towards the democratic party.

This paper is organized as follows. Section II goes over the literature relevant to the current study. Section III elaborates on the general predictions and Section IV describes the research design. Section V describes the data I use for my analyses and finally, section four presents the results of the analyses. The analyses are carried out at the state and individual level. Section VI goes through the actual analyses and presents the results. Finally, Section VII concludes.

II. Literature Review

Traditional theories in trade politics divides winners and losers of trade liberalization along the lines of industry or factors of production. The two leading models of the distributional effects of trade are Ricardo-Viner model and the Stolper-Samuelson model. The Ricardo-Viner model posits that individuals employed in the export-oriented sector are more likely to support free trade compared to individuals employed in the import-competing sector because they are the ones that benefit from expanded trade. According to the Ricardo-Viner model, open trade forms political cleavage between workers in the export-oriented sector and the import-competing sector.

The Stolper-Samuelson model posits that liberalization of trade benefits owners of the factors of production that are abundant relative to the rest of the world, while hurting owners

of factors of production that are scarce. The Stolper-Samuelson model thus suggest that open trade forms political cleavage between laborers and owners of capital. Both models are based on the assumption that firms within sector or class are homogeneous. The Ricardo-Viner model assumes that all firms in the export-oriented sector engage in foreign exports at the same level of intensity and that liberalization of trade uniformly benefit firms in the export-oriented sector. Similarly, the Stoper-Samuelson model assumes that there are no divergence among owners abundantly endowed with labor or owners abundantly endowed with capital.

Yet, scholars in more recent years have diverged from industry or class-based conflict and brought down their focus to individual firms. Milner (1988) in her work argues that homogeneity within industry has weakened as globalization induced firms within the same industry to form different levels of export dependency. As a matter of fact, Melitz (2003), accounting for the fact that firms are heterogeneous in terms of productivity, finds that the more productive firms are the ones that thrive when exposed to trade, while the least productive ones exit the market. Thus, firm heterogeneity pits highly productive exporting firms that reap the benefits from liberalization of trade against the less productive import-competing firms that incur losses from foreign imports, creating an intra-industry divide in policy preferences (Topalova and Khandelwal 2011).

Three strands of literature expand on the firm centric model of trade preferences. The first strand concerns firm heterogeneity in Foreign Direct Investment (FDI). Research in this first strand argue that firms' preferences for free trade depend on their involvement in FDI and global sourcing (Osgood 2017; Osgood 2018; Osgood 2019). Baccini, Pinto and Weymouth (2017) further find that Free Trade Agreements (FTAs) disproportionately affect Multinational Corporations (MNCs), benefiting the largest and most productive firms. Firms that actively engage in FDI also differ in their preferences for other trade related policy issues compared to those that are not as involved in FDI. They are less likely to file Antidumping petitions (Jensen,

Kim and Weymouth 2015) and are more concerned about protecting foreign investment (Kim et al. 2019).

The second strand of concerns firm heterogeneity in productivity and product differentiation. Research in the second strand argue that highly productive firms are more likely to support trade liberalization than less productive firms (Melitz 2003; Plouffe 2012). This was especially true when firms produced highly differentiated products because firms could export more varieties of product while fearing less about product substitution (Kim 2017; Spilker et al. 2018).

The third strand which concerns firm heterogeneity in firm size and exports, arises from the finding that variation in firm size is largely explained by the distribution of exports of the firms in the top one percent of the country (Freund and Pierola 2012). Building off of the fact that firms are heterogeneous among large exporting firms, subsequent studies have found that larger exporting firms are the greatest advocates for trade liberalization and globalization (Osgood 2017; Kim and Osgood 2019).

My study also contributes to the vast literature that explores the relationship between negative economic shocks and political polarization. De Bromhead et al. (2013) found that during the Great Depression, support for more right-wing parties were more powerful in European countries with persisting economic downturn. In France and Germany, regions exposed to competition with low-wage workers abroad were more likely to support the extreme right (Malgouyres 2014, Dippel et al. 2015) and regions with more exposure to Chinse trade in Britain were more likely vote for leaving the European Union (Colantone and Stanig 2016).

With regard to exposure to import competition from China, support for protectionist bills were stronger for politicians whose districts experienced larger extent of exposure to import competition (Feigenbaum and Hall 2015). Moreover, legislators from congressional districts that war hit hard by the China trade shock were more in favor of adopting hard-line

policy toward China (Kleinberg and Fordham 2012, Kuk et al. 2015). Autor et al. (2016) extends the existing literature by uncovering a causal relationship between Chinese import shock and polarization. They find evidence that the Chinese import shock increases polarization, which aligns with the results of previous studies. They argue that increased political polarization is induced by new ideologically extreme legislators being elected into office, rather than incumbent legislators becoming more ideologically extreme. They speculate that such change is caused by the fact that import shock encourages voters to split according to whether they are in the disadvantaged minority.

For the purpose of the study, I use Political Action Committee (PAC) donations to political candidates as a measurement for political support. The two main reasons why PACs give campaign donations to political candidates is to influence the policy making procedures of the legislators when they take office or to affect the election outcome. In any way, through campaign contributions, PACs attempt to achieve their distinct interests by gaining access to the decision-making process of incumbents (Grossman and Helpman, 1996). However, it has often been the case that PACs give contributions to both the republican and democratic party candidates, making them appear as if they do not have a particular party preference. Yet, examining PAC contribution data from 1979 to 2002, Brunell found that generally, PACs gave less money to less preferred parties and gave more money to more preferred parties (2005). In other words, PACs do have a clear and distinct preference for one party over another. There are diverse factors known to account for PAC contribution. The size of the PAC, the organizational factors of the PAC and its internal mechanisms are some that have been found to affect PAC behavior (Wilcox 1988).

III. Theory

While less is known about the formation of trade preferences within the agricultural sector, the fact that the nature of the agricultural sector is fundamentally different from that of the manufacturing sector suggest that the two sectors should differ in the way that political coalitions are formed. I begin by exploring the differences between the two sectors.

The agricultural sector differs from the manufacturing sector in two main aspects. First, agricultural yields are highly susceptible to changes in the climate, making the agricultural sector particularly vulnerable to losses. The fact that agricultural yields are contingent on the climate, which is beyond human control, puts farmers in a disadvantaged situation. Unlike the manufacturing industry where the quantity and the quality of the output is relatively consistent, the quantity and the commercial value of farm yields drops drastically in case of drought, high precipitation or when struck with other natural disasters. Such uncertainty and the resulting fluctuation in farm income have induced farm groups to uniformly call for more protection of their industry.

Second, agricultural commodities are less diversified compared to manufacturing goods and agribusinesses typically do not engage in foreign direct investment. Previous research on product differentiation and lobbying behavior finds that sectors that face higher degree of competition and less product differentiation tend to lobby together (Bombardini and Trebbi 2012). Furthermore, Osgood (2017), finds that industries that involve more vertical FDI are more likely to display within industry fragmentation in trade preferences. The claim is made on the basis that liberalization of trade disproportionately affects the multinational firms and the rest of the other smaller firms in the industry. Multinational firms support trade liberalization as they can expand exports and flourish while the other smaller firms face greater competition from increased imports. The agriculture industry however, with lower levels of

product differentiation and lower engagement in vertical FDI, will be more unified in their preferences for trade. In the absence of the small number of multinationals that can benefit from reduction of tariffs, all farms will simultaneously face threats from increased imports and therefore will collectively be opposed against free trade.

Based on the observed differences joined with the fact that the US agricultural groups have long been supporters of the conservative party, I predict that the US agricultural sector display fairly uniform support to the Republican party before the break out of the US-China trade war. However, I argue that the trend will change after the onset of the US-China trade war. The massive harm that US-China trade war inflicts on the US agriculture industry will overturn the pre-existing trends. Yet, it will do so in a way that is consistent with the firm centric model of trade preferences.

Just as firms in the manufacturing industry, farms in the agricultural industries will vary in size and productivity. The increased tariffs that result from the US-China trade war, therefore, works to disproportionately affect the agricultural industry. The larger and more productive farms that used to actively engaged in exports will undergo loss in profits due to the increased tariffs that make their products more expensive in the market. On the other hand, the smaller and less productive farms that did not engage in export activities will face reduced competition due to the high import tariffs. Because of reduced competition, less productive farms would be able to benefit from the US-China trade war which would thus lead them to maintain or even in some cases, strengthen their support for the Republican party. Therefore, I predict that the larger and more productive farms will be more opposed to the protectionist trade measures.

In sum, my two main predictions are as follows. First, farm groups will be more unified in their political preferences before the onset of the US-China trade war. However, such trend will reverse after the onset of the US-China trade war, and the agricultural sector will feature

increased fragmentation in trade preferences. Second, larger and more productive farms will be more likely to oppose increased tariffs.

In testing my predictions, I rely on agricultural PAC donations to federal candidates to measure farmers' political preference. More specifically, I use American Farm Bureau Federation (AFBF) PAC contributions. The American Farm Bureau Federation (more commonly known as the Farm Bureau) is an agricultural interest group that is affiliated with 50 states. There is at least one Farm Bureau located in each of the 50 states and these Farm Bureaus individually make political contributions instead of making one single joint contribution. The roles that interest groups play in politics are to represent the opinions of some the constituents and their members, monitor their complaints and demands and ensure that the demands are clearly delivered to legislators (Hansen 1991). In order to make the demands heard by the legislators and thereby achieve their distinct interests, interest groups attempt to gain access to the decision-making process of incumbents through campaign contributions (Grossman and Helpman 1996). Thus, it is safe to assume that the Farm Bureau's donations to federal candidates represent the interest of the local farmers. They give more to parties that are more aligned with their members' interests and give less to the parties that are at odds with their members' interests.

As the term "war" implies, the US-China trade war was not a natural process that would have come about without intervention and the perpetrator is evident: it was president Trump who initially declared to increase tariffs on Chinese goods. Therefore, the agricultural PACs' reduced donations to the Republican party or increased donations to the Democratic party in the immediate years after the declaration of increased tariffs on Chinese goods in 2018 is suggestive of the fact that farm groups are opposed to the US-China trade war and the protectionist trade policy.

IV. Research Design

In order to test my predictions on political cleavage within the US agricultural sector, I look at how political preferences of agricultural interest groups change before and after the US-China trade war. This allows me to capture whether interest groups share same political interests or diverge, which implies intra-industry disagreement on trade policies. I also conduct regression analysis to identify the relationship between farm productivity and partisanship.

V. Data

Two sources of data are used for my study. One is the PAC contribution data made available by the Center for Responsive Politics (CRP). The PAC data provides precise information about the year, donor, the recipient (federal candidate) and the total amount of contributions made to each of the recipients. I specifically make use of the data on political contributions that state Farm Bureau PACs made to federal candidates from 2014 to 2020. Because CRP only provides organized data for even years, I went through the actual documents filed on Federal Election Commission (FEC) to collect data for the odd years. The second source of data is retrieved from the 2017 US Agricultural Census, which makes available, state-level and county-level farm related statistics.

VI. Analyses

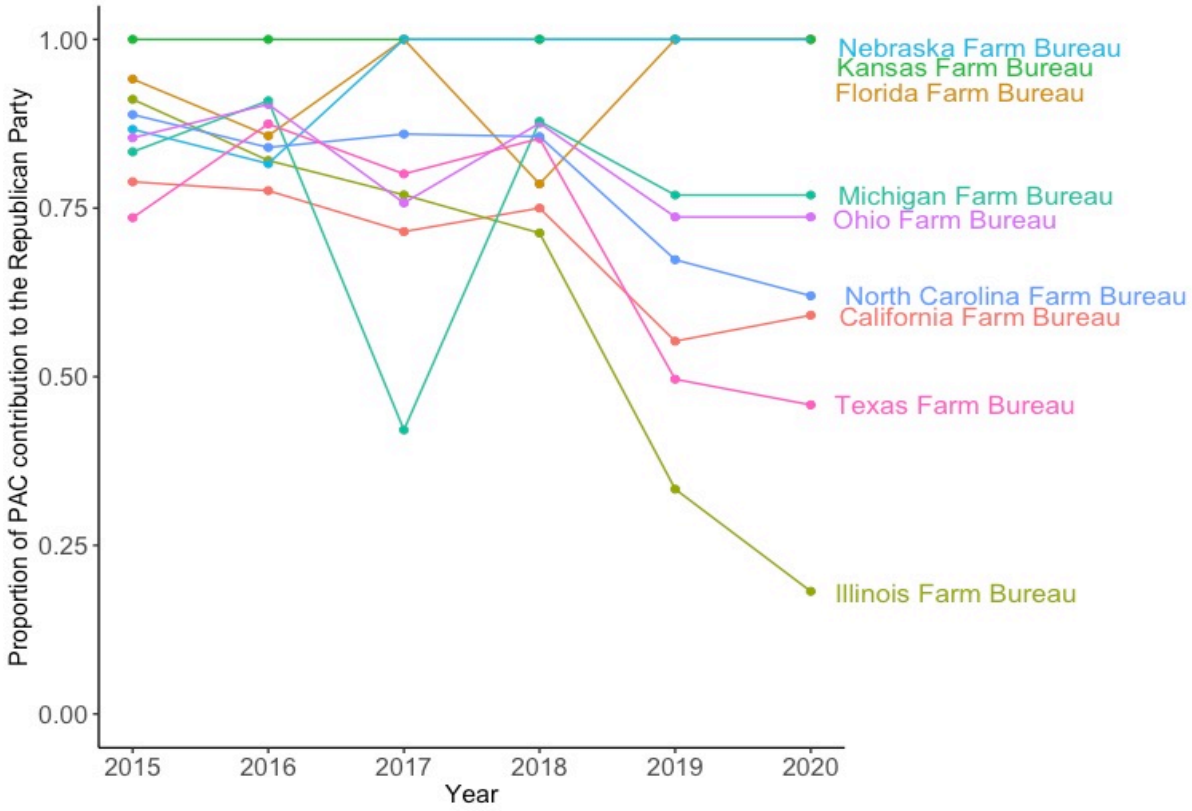
I preliminarily examine how the Farm Bureau PACs' political support change after the onset of the trade war. I do so by creating a line plot, plotting the year variable (2014 to 2020) on the x axis and proportion of PAC contribution that was given to the Republican party on the

y axis. The proportion is calculated by simply dividing the amount that was donated to the Republican party by the total amount of contributions. As of June, 14 state Farm Bureaus made contributions to federal candidates in 2020. However, only 10 of them (Arizona, California, Florida, Illinois, Kansas, Michigan, Nebraska, North Carolina, Ohio, Texas) are included in the line plot as they are the only Farm Bureaus that have persistently made contributions since 2014.

The result is shown in [Figure 1]. Although some fluctuations are observed in 2017, the figure suggests a general trend where PACs prior to the outbreak of the US-China trade war are fairly unified in their support for the Republican party, represented by the high proportion of PAC contribution to the Republican party. However, following the outbreak of the trade war in 2018, preferences become highly variegated which is represented by the divergence of lines in the years following 2018.

Some PACs opted to provide more support to the Republican party candidates in 2020 compared to 2016, others opted to support Democratic party candidates instead. Illinois, Texas and California were among the ones to show greatest shift in party preferences. Other states, such as North Dakota and Nebraska maintained their support for the Republican party throughout the years. In sum, two important observations can be made from [Figure 1]. First, there is a general decline in the support for the Republican party after the onset of the US-China trade war in 2018. Second, farm interest groups are more ideologically split after the outbreak of the trade war, indicating presence of intra-industry political cleavage.

[Figure 1] PAC contribution to the Republican party in 10 states (2015-2020)



My first hypothesis is that farms on average will be negatively impacted by both the tariffs on Chinese imports and the Chinese retaliatory tariffs and that the agricultural sector on average will display reduced support for the Republicans after the onset of the US-China trade war implying their opposition to the protectionist policy. Thus, my first hypothesis is presented as follows.

Hypothesis 1. *Agricultural interest groups on average will be less likely to support the Republican party after the onset of the US-China trade war.*

I use regression analysis to test my hypothesis, in which the dependent variable is the proportion of Farm Bureau PAC contribution that was given to the Republican Party and the

independent variables are year and average US tariffs on Chinese goods. I include a control for presidential election years to account for possible fluctuations in PAC contribution behavior.

[Table 1] Regression of 10 states in six years (2015-2020)

	Dependent variable:		
	Proportion of Contribution to the Republican Party		
	(1)	(2)	(3)
Year	-0.027*		
	(0.014)		
avgtariff		-0.006*	-0.006*
		(0.003)	(0.003)
preselec			-0.023
			(0.049)
Constant	54.319*	0.876***	0.883***
	(27.488)	(0.040)	(0.043)
Observations	58	58	58
R^2	0.063	0.057	0.060
Adjusted R^2	0.047	0.040	0.026
Residual Std. Error	0.177 (df = 56)	0.177 (df = 56)	0.179 (df = 55)
F Statistic	3.788* (df = 1; 56)	3.370* (df = 1; 56)	1.768 (df = 2; 55)
Note:			*p<0.1; **p<0.05; ***p<0.01

[Table 1] presents the results. The result indicates that support for the Republican party of the Farm Bureau PACs fell by 2.7% with each additional year. The result was the same when the control for presidential election years was included. Similarly, support for the Republican party fell as US tariffs imposed on Chinese imports climbed. This finding confirms the first hypothesis that the agriculture sector on average were more opposed to the Republican party after the US-China trade war.

Yet, [Figure 1] poses further question on what accounts for the increased partisanship among the different state farm PACs – why did some states started giving more to Democrats? Why did other states retain their support for the Republican party? The new-new trade theory (Melitz 2003; Bernard et al. 2007) suggest that highly productive exporting firms enjoy large

benefits from liberalization of trade, as opposed to less productive firms that face increased competition with foreign imports. The reverse is true for protectionist trade measures. With protectionist measures in practice, the benefits that the highly productive exporting firms once enjoyed by expanding exports are going to be cut off and therefore incur losses. On the other hand, less productive firms that once used to compete with foreign imports will no longer face as much competition and are thus going to benefit. Applying the firm centric model to the current study, I predict that states constituted of more productive farms are more likely to be harmed by the trade war due to fall in exports and are therefore less likely to support the Republican party that initiated trade war after 2018. My second hypothesis is as follows.

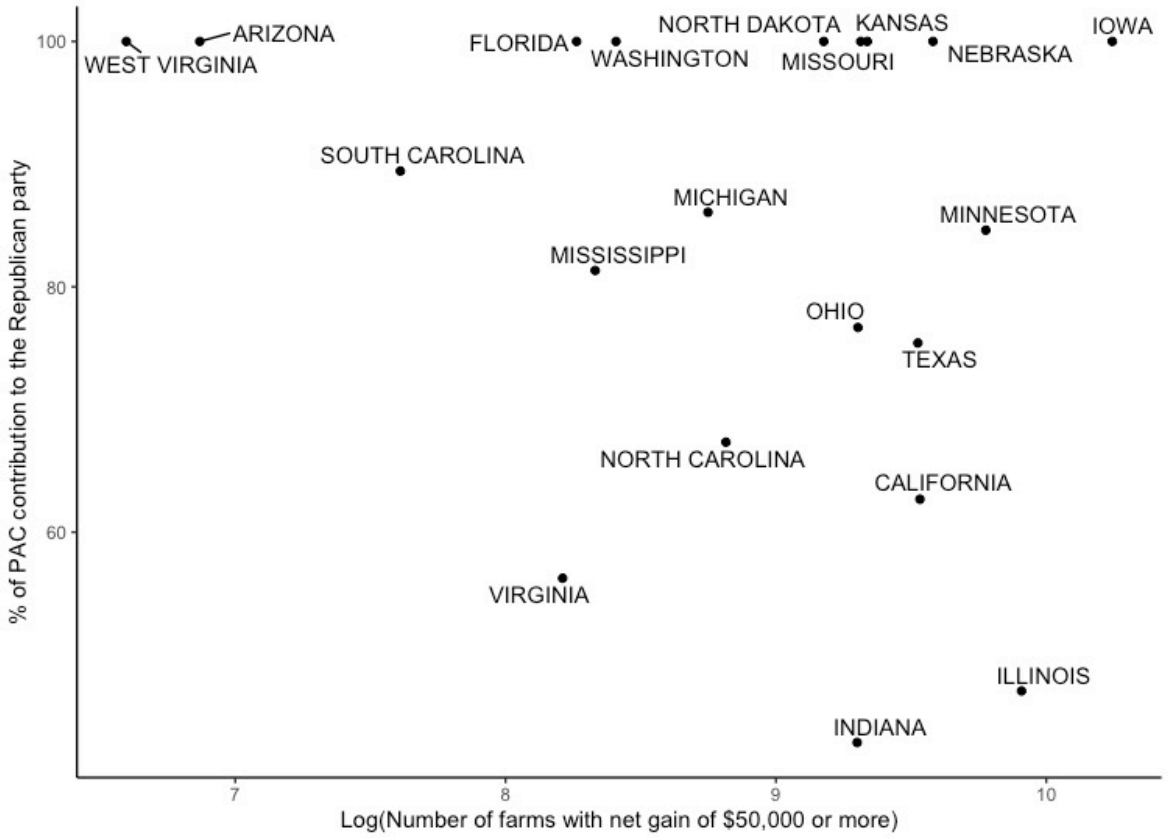
Hypothesis 2. *Farm PACs representative of states that are constituted of more productive farms are less likely to support the Republican party.*

In my analyses for texting the second hypothesis, I include all the state Farm Bureaus that made contributions to the federal candidates after March 2018, which is the month when President Trump declared to impose tariffs on imported goods from China.[1]

I use farm income and total value of exports in 2017 as a proxy for measuring farm productivity. I draw scatter plots in order to see if there are any correlation between political preference and farm productivity.

[1] Opensource.org indicates that the Oregon Farm Bureau contributed a total of $1,000 to federal candidates in 2018. However, according to the actual document filed, this contribution has been made in 2017 and is therefore excluded from my analyses.

[Figure 2] Farm size vs. PAC contribution to the Republican Party

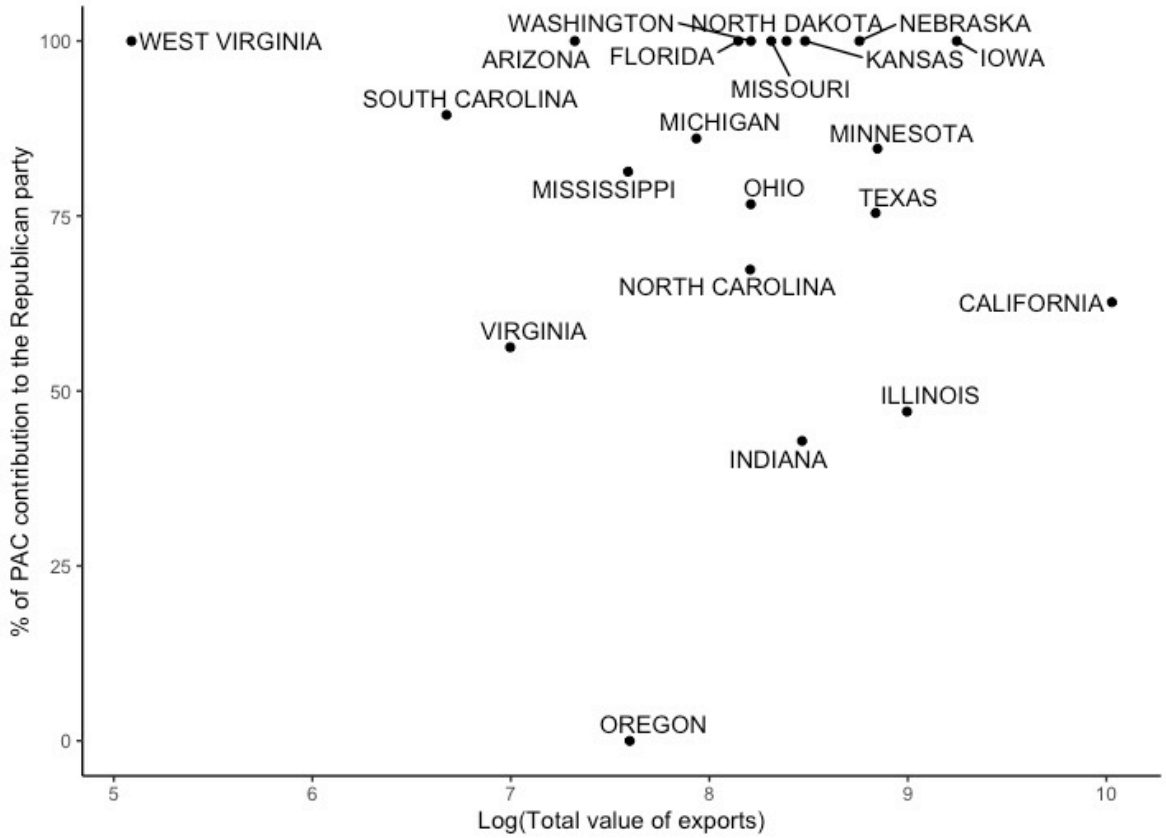


[Figure 2] presents the relationship between the logarithm of the number of farms with net gain of $50,000 or more and proportion of PAC contribution given to the Republican party in 2020. A roughly negative correlation between farm productivity and support for the Republican party can be observed in the scatterplot. Indiana and Illinois which had the greatest number of highly productive farms in 2017 showed least support for the Republican party (in opposition for trade protectionist measures) in 2020. West Virginia and Arizona which had the least number of highly productive farms in 2017 showed greatest support for the Republican party (in support for trade protectionist measures) in 2020. This provides supporting evidence to my expectation in hypothesis 2.

Larger and more productive farms are also more likely to export their commodities abroad. I, therefore, use the total value of exports as another proxy for measuring farm

productivity. Plotting the logarithm of the value of agricultural exports of each state in 2017 and the corresponding Farm Bureau's PAC contributions to federal candidates after the onset of the US-China trade war, I get [Figure 3].

[Figure 3] Farm exports vs. PAC contribution to the Republican Party



Again, the results are similar. There is an approximate negative relationship between value of agricultural exports and the state farm PAC's contribution to the Republican party.

I conduct regression analyses to test whether productivity is indeed associated with contributions. First, I regress the proportion of contributions made to the Republican party on the log number of big farms. Here, I control for the age of the producer as age could possibly affect political preferences and the years the producers have operated on the farms to control for any variation in productivity that comes from accumulated years of experience. The average

producer age and average years of operation for each state is therefore included in the analysis. The result of the regression analysis using robust standard errors is reported in [Table 2]. The result indicates that states with larger farms were less likely to support the Republican Party after the onset of the US-China trade war. The result becomes more significant when controlling for producer age and their years of operation on the farm.

[Table 2] Farm size and PAC contribution to the Republican Party

	Dependent variable:			
	Proportion of Contribution to the Republican Party			
	(1)	(2)	(3)	(4)
Log(bigfarms)	-5.40	-8.02**	-7.54*	-8.74***
	(3.61)	(3.27)	(3.95)	(3.37)
Producer age		160.10		105.73
		(102.04)		(115.57)
Years of operation			-111.42*	-83.65
			(66.09)	(81.70)
Constant	131.24***	35.54	187.65***	110.38
	(29.93)	(79.62)	(47.31)	(117.37)
Observations	20	20	20	20
R^2	0.08	0.13	0.14	0.16
Adjusted R^2	0.02	0.03	0.04	0.003
Residual Std. Error	19.00 (df = 18)	18.96 (df = 17)	18.84 (df = 17)	19.20 (df = 16)
F Statistic	1.46 (df = 1; 18)	1.27 (df = 2; 17)	1.39 (df = 2; 17)	1.02 (df = 3; 16)
Note:				*p<0.1; **p<0.05; ***p<0.01
				cross-sectional data from 2019 to 2020, post trade war

Next, I regress the proportion of contributions made to the Republican party on the log value of agricultural exports. I again, control for producer age and years of operation. The result of the regression analysis using robust standard errors is reported in [Table 3]. The result indicates that states that export more agricultural commodities were less likely to support the Republican Party after the onset of the US-China trade war.

[Table 3] Farm exports and PAC contribution to the Republican Party

	Dependent variable:			
	Proportion of Contribution to the Republican Party			
	(1)	(2)	(3)	(4)
Log(total value of exports)	-4.22	-4.93*	-5.96*	-5.89*
	(3.14)	(2.91)	(3.14)	(3.20)
Producer age		-74.09		-47.03
		(67.22)		(90.63)
Years of operation			126.77	89.22
			(121.67)	(157.13)
Constant	117.83***	148.50***	37.85	81.01
	(24.71)	(32.75)	(84.80)	(129.73)
Observations	20	20	20	20
R^2	0.05	0.09	0.09	0.10
Adjusted R^2	0.001	-0.02	-0.02	-0.07
Residual Std. Error	19.22 (df = 18)	19.44 (df = 17)	19.40 (df = 17)	19.88 (df = 16)
F Statistic	1.01 (df = 1; 18)	0.80 (df = 2; 17)	0.84 (df = 2; 17)	0.59 (df = 3; 16)
Note:				*p<0.1; **p<0.05; ***p<0.01
				cross-sectional data from 2019 to 2020, post trade war

The above findings confirm my speculation that more productive farms will be less likely to support the Republican party, while the opposite is true for less productive farms. The findings evidence that the US-China trade war disproportionately inflicted harm on the agricultural industry, harming the larger and more productive farms more severely than the smaller and less productive farms. Such distributional consequences of the trade war led the more productive farms to oppose the ongoing protectionist trade policy which is manifested by their decreased donation to the Republican party.

Yet, the state level analyses conducted above is limited to a small number of samples and it is not clear whether other agricultural interest groups besides the Farm Bureau will display a similar behavior, decreasing their contribution to the Republican party in the wake of the trade war. Therefore, I look at how the average spending of agricultural PACs change by subsector. [Figure 4] shows that the proportion of contribution to the Republican party were

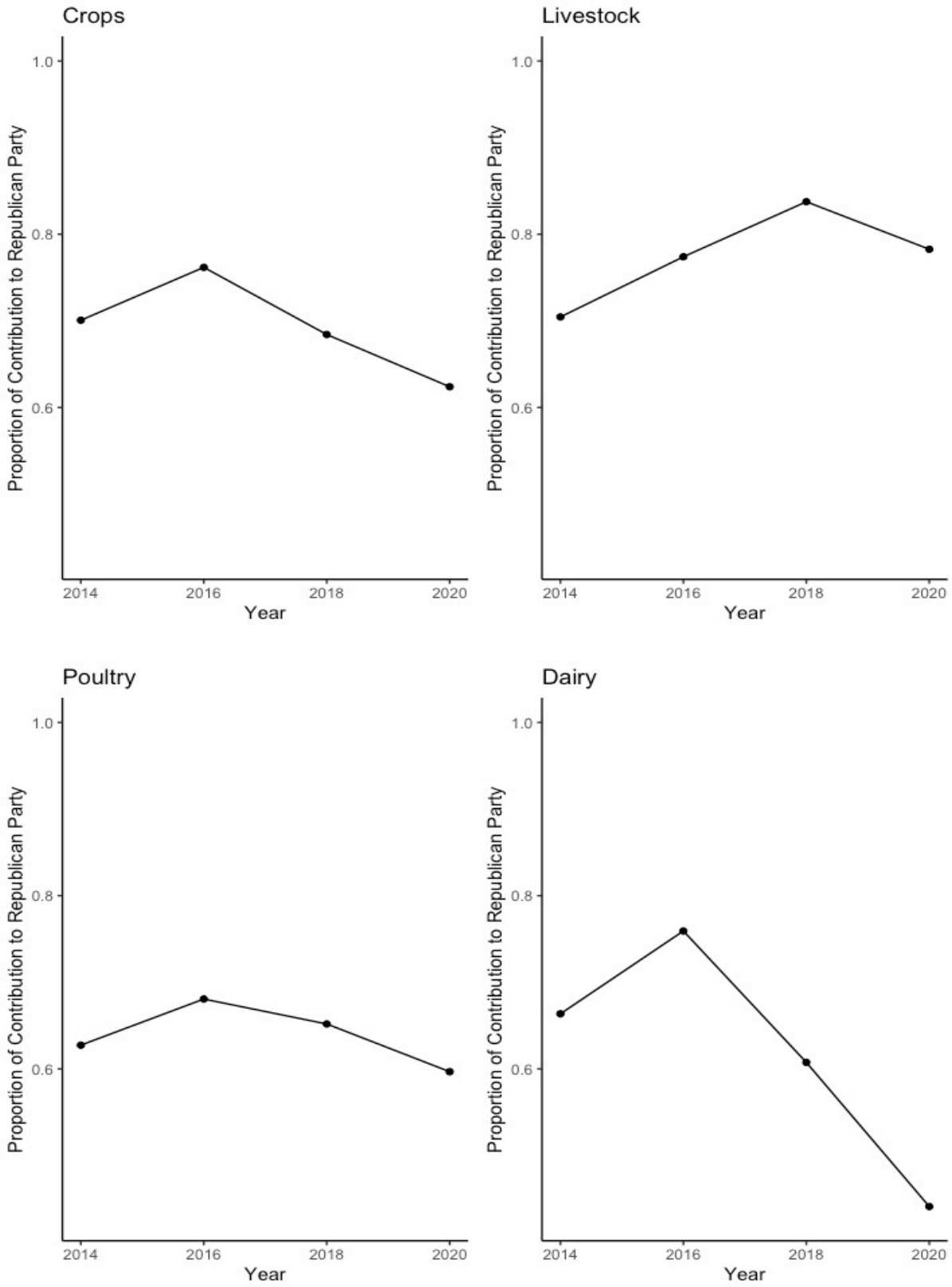
about the same in all the subsectors before the breakout of the US-China trade war in 2018 with all subsectors giving more to Republicans than Democrats.

Except for the livestock subsector, the average contribution of interest groups for crops, poultry and dairy to the Republican party immediately falls in 2018. It is also notable that the extent to which the support for the Republican party falls greatly diverge. While the dairy subsector shows a substantial fall in support for the Republican party going way down below 60%, the decrease is more modest for other subsectors. The different rates of change in support for the Republican Party shows that some subsectors experienced more harm to their industry after the onset of the US-China trade war than other subsectors. This again, indicates that the characteristics of the individual farms are not uniform, although they are all included in the same agricultural industry.

The different rate of change in support for the Republican Party additionally indicates signs of political cleavage within the agricultural sector; a finding which aligns with the previous results derived from Farm Bureaus. The sharp decline of support for the Republican party observed for subsectors such as crops and dairy implies that farmers in those subsectors are likely to hold a different policy preference from farmers operating in subsectors where the decline of support for the Republican party is relatively moderate.

In sum, the investigation of how other agricultural interest groups change their donation behavior before and after the trade war confirms that the reduced support for the Republican party is an industry wide phenomenon. Yet, the extent to which support decreases varies according to the subsectors, leading to more divergence in political preferences after the onset of the trade war. The above findings demonstrate that the increased political disagreement after the trade war is not a phenomenon that is unique to American Farm Bureau PACs.

[Figure 4] PAC contribution to the Republican party by agricultural subsector (2014-2020)



VII. Difference-in-Difference Design

A difference-in-difference design is employed to survey how farm related interest groups in the US changed their donating behavior after the US-China trade war in 2018. We have seen above that political preferences of Farm Bureaus that represent states that are highly productive in agriculture have shifted their preference while those Farm Bureaus that represent states that are less productive in agriculture have not been as affected by the trade war and retained their political preference. Therefore, a difference-in-difference design is useful for determining whether the US-China trade war causes decline in support for the Republican Party for highly productive businesses.

The data includes the percentage of the contribution that top 20 contributors from each of the farming sectors – including vegetables and fruits, sugar cane and sugar beets, tobacco, dairy, poultry and eggs and livestock – spent on the Republican party biannually from 2014 to 2020. Then, the state where the headquarters of the individual farm businesses are located is recorded along with the rank of the state according to its farm receipt in 2017. The headquarters is recorded as NA in case the business is an international corporation that is not originally from the US or when the business represent interests of farmers from multiple states. Some examples of the latter case are the National Potato Association, US Apple Association and US Beet Sugar Association. This data is matched with the amount of farm receipt and the rank for each state, which is found on the 2017 US Agricultural Census. Excluding those that contain NA values, a total sample of 379 unit-years was collected with business headquarters being located in 35 states. The following equation is measured using OLS.

$$Y_i = \alpha + \beta T_i + \gamma t_i + \delta(T_i * t_i) + \varepsilon_i$$

The intervention in the design is the outbreak of the trade war in 2018. I estimate the treatment effect by running an OLS regression of the outcome on the intercept, a time dummy variable, a treatment group dummy variable, an interaction term between the time and the treatment group dummy variable. The outcome variable is the percentage of the interest group spending that is spent on the Republican Party, calculated by dividing the amount spent on the Republican Party divided by the total amount spent. The time dummy is coded as 1 if the observation is after 2018 and 0 if the observation is before 2018.

Farm businesses, whose headquarters is located in a state that has high agricultural productivity is assigned to the treatment group. Businesses, whose headquarters is located in a state that has relatively lower agricultural productivity is assigned to the control group. The assignment to the treatment and control group in this study is subject to criticism. First, using the location of headquarters is not as accurate as measuring individual productivity of the businesses.

However, this is not feasible as individual data on the businesses are not available. This is especially the case when the businesses are small family owned businesses. Second, the cutoff value for low productivity and high productivity is ambiguous. In the analysis, businesses located in the top 15 states that had the highest productivity are assigned to the treatment group. Others that are not in that 15 states are assigned to the control group. As a result, there are 203 units in the treatment group and 176 units in the control group. The errors are clustered at the individual level

[Table 4] Result of Difference-in-Difference Estimation

	Dependent variable:
	Proportion of Contribution to the Republican Party
treatment	0.045
	(0.046)
time	-0.012
	(0.048)
treatment:time	-0.071
	(0.065)
Constant	0.731***
	(0.033)
Observations	379
R^2	0.009
Adjusted R^2	0.002
Residual Std. Error	0.317 (df = 375)
F Statistic	1.194 (df = 3; 375)
Note:	*p<0.1; **p<0.05; ***p<0.01

[Table 4] reports the results of the OLS regression. The average treatment effect turns out to be -0.071. Although the outcome is not statistically significant, the treatment effect was negative, meaning that the trade war caused agricultural groups in states with less agricultural productivity to somewhat shift their political preferences as a consequence of the US-China trade war. The results align with the above-mentioned argument that states that are more dependent on agricultural business are more likely to be harmed by the US-China trade war, as the welfare of the state will decrease as a whole due to fall of exports of agricultural goods. The decrease in welfare of the state may then drive businesses located in those states to be more opposed to the Trump administration's protectionist measures and thus, provide less support to the Republican Party.

VIII. Conclusion

This study adds knowledge to the literature on the firm centric model of trade preferences by finding its applications on the US agricultural sector. The two main findings of my research are as follows. First, the US agricultural sector is less likely to be politically divided in normal circumstances. I argue that fewer engagement in FDI, lower levels of product differentiation and long-held conservatism accounts for the political unification. Second, the trend reverses when severe harm is inflicted on the agricultural sector and political disagreement begins to form which is explained by the differences in the size and productivity of the farms.

Further developments are possible. My research fails to take into account the amount of protection that the government grants to the farms. In fact, President Trump devised multiple farm bailout programs in 2018 and 2019 to help farmers offset their loss incurred by the trade war. While the efficacy of the bailout program – whether the amount is sufficient or not – is a controversial issue, it is possible that the aid granted to farms had influence on the Farmers' political preferences and accordingly, their donation to the PACs. Therefore, it would be interesting to see what role subsidies plays in formation of political cleavage.

Export supply elasticity, the measure of how export supply changes according to export price, is another element that could enrich the current study. This paper insists that the US agriculture sector incurred loss from reduced exports to China after the US-China trade war, which in turn, induced the farm groups to oppose protectionist trade measures. However, if there are third countries that the farms can divert their exports to, they would be able to make up for the loss incurred by their reduced exports to China and may not suffer as much. In this case, opposition for protectionist trade measures would be dampened. Therefore, export supply

elasticity of the commodities may be able to provide explanation on why productive farms maintain their support for the Republican party even after the breakout of the trade war.

Lastly, this paper shows that PACs punish the incumbent party for executing a trade policy measure that harm their industry by reducing the amount of contribution. Yet, it raises questions on how PACs punish the party. Do PACs simply cut off giving money to the candidates that they used to support? Or do they start giving more to the candidates in the opposing party? Tracing the donations that the candidates received from PACs serves to provide answers to these questions. Identifying how much contributions that individual federal candidates receive from the PACS before and after the trade is thus necessary, in order to shed light on how interest groups punish parties for implementing policies that are at odds with their preferences.

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