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The endogenous effects on the three judges group on the judicial circuit panel

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***ABSTRACT**: The goal of this article is to examine whether the judges' votes can influence others' votes when serving on the appellate panels, which final decision is based on majority rule. The data of this article come from the same data of the article 'Institutional Dynamics on the U.S. Court of Appeals: Minority Representation under Panel Decision making' written by Farhang and Wawro. Section two of the article is to explain the general explanations of the peer effects. Furthermore, part three is about analyzing the data, then discussing and concluding.*

***KEY WORDS**: Endogenous effects, judges group, circuit panel*

1. Introduction

The goal of this article is to analyze how the votes made by judges affect other judges and how the votes of that individual judges bring reversely affected. Most of the standard methods in judicial politics are to account for judges' characteristics, which is severely inadequate to analyze the judges' actions. This kind of method neglects the individualistic elements that attribute to the whole panel members, which is not efficient in explaining the judges' behaviors.

Furthermore, an accurate assessment of judges needs to investigate whether and to what extent the quality of judges affects their votes and affects their panel members. The article 'Institutional Dynamics on the U.S. Court of Appeals: Minority Representation under Panel Decision making' (Sean Farhang and Gregory Wawro, 2016) comes up with the result of the empirical analysis that, compared with the panel with three male members, male judges tend to vote more liberally when one woman serves on the panel at the same time. Farhang and Wawro built the two logistic analyses based on variables to predict the behaviors of panels assembled by the judges' indifference. For predicting the votes of individual judges, their explicit model panel-level effect includes a series of variables indicating gender, race, and ideology of the colleagues in the panel of judges. The presence of the peer effect in the filed of judicial decisions has been practiced for a long time. Scholars have advanced numerous potential explanations. These theories include whistleblowing

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(Cross & Tiller 1998), bargaining or log-rolling (Farhang & Wawro 2004), dissent aversion (Epstein, Landes, & Posner 2011; Posner 2008), and the dynamics of deliberation, such as how individuals in groups react to agreeable (and disagreeable) arguments (Sunstein et al. 2006). (Thomas J. Miles, "The Law's Delay: A Test of the Mechanisms of Judicial Peer Effects") However, mainly showing the exogenous part of the peer effect in judicial decision making is not adequately explained and understood.

There are previous articles about the endogenous effects existing. The work of Fischmanj 'Interpreting Circuit Court Voting Patterns: A Social Interactions Framework' examines how the panel's decision can be explained as the results of the influencing relationships among judges. The estimated impact of colleagues' votes on a judge's vote is 80% as massive as one would find on courts that mandate unanimity, such as in many civil law countries. (Joshua B. Fischman). We think that only considering the judgment's factors or characteristics for the final judgment or the formulation of legal regulations cannot fully explain the judge's motivation for making the judgment. Sometimes the judgment made by the judge may not be influenced by personality, race, and gender; for consideration of the outcome of the judgment, or a specific purpose, the judgment may be more derived from other sources, like other judge's votes, not the characteristics of other judges. We are studying the endogenous effect, which is the direct mutual influencing relationship between needs to ignore ideology for votes as much as possible. In the experiment, we must eliminate the impact of confronting effects on the result of the experiment.

2. Peer effect

To understand the relationship, which might be the judges' individualistic characteristics, genders, races, or ideologies, influencing other votes' tendentiousness or the mutual influencing relationships among votes, needs to grasp the essences or the reason why such influences exist, which are about peer effect. Peer effects are also known as peer group effects, which refers to the theory that a person is in a particular group. His behavior and results are affected by the behavior and characteristics of the surrounding people. The people who influence themselves are "peer" who are the people in an equal position with them. The peer effect was widely used in education. At present, it is also used in the research of anti-poverty, eliminating racial segregation, reducing drug and alcohol abuse, and, in the case of this article's topic, judges of federal panel decision-making. For the study of the peer effect, it should be noted that the impact on a person is not only from peers. For example, students in the luxury private high schools are more likely to be admitted to top universities, like the IVY leagues ones. However, the successful applications might not only contribute to the reason that the students in these high-tuition schools are excellent, leading to a good peer effect. It may also because these high schools have better hardware facilities, a higher level of teachers, or because they study Students have to pass the examination screening before entering the school with outstanding. Only after eliminating these influences can we still find that the

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students' scores and their classmates' scores have increased simultaneously to prove the peer effects.

Exogenous Effects

The peer effect can be classified into two categories: Exogenous and Endogenous effects. The Exogenous peer effect, also called contextual peer effects, can be described using exogenous variables to study how the variables influence others. The exogenous variables are the factors in a causal model or a causal system whose value is independent of the state of other variables in the system; its value is determined by factors or variables outside the causal system being studied. To be more specific, in the work of Farhang and Wawro, they found out that the influence of gender and ideology on judges' voting is not only determined by the judge's gender or general ideology. The gender composition affects the behavior of male judges, while the general ideological composition of the jury influences the way all judges vote on the jury. In the model, the panel component variables were included, and they obtained the substantial significance of gender and ideology for the final results. To sum up the idea, every aspect of the characteristics, which stands for the exogenous variables here, have clear signs of

influencing, which is an experiment based on exogenous peer effect.

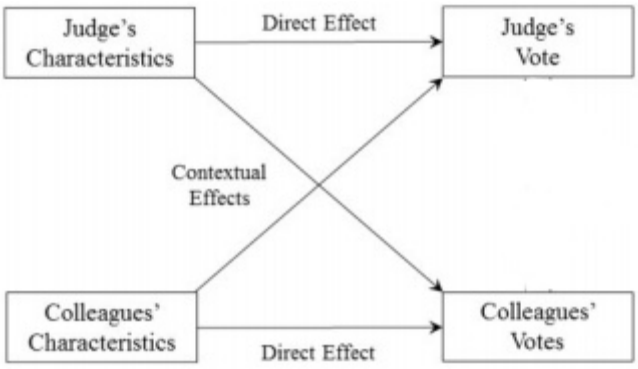

Figure 1

Endogenous effects

The endogenous effect refers to the general theory that the propensity of an individual to behave varies with the behavior of the group. The factors that control the interacting relationship on people's behaviors is the endogenous variable. Fundamentally, the endogenous variables are used in the economic model by people, qualifying its significance in the group lending programs. The article 'HOW IMPORTANT ARE ENDOGENOUS PEER EFFECTS IN GROUP LENDING?

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ESTIMATING A STATIC GAME OF INCOMPLETE INFORMATION' (J. Appl. Econ. (2012)) examined that using a dataset from a group lending program in India, they found sizeable endogenous effect's influences. According to the Appl, the members of the group are neighbors who know each other very well. They may be able to observe each other's use of funds and distinguish between intentional and irresponsible defaults (e.g., investing in risky projects, buying tobacco, alcohol, and tobacco) that may result from unexpected adverse shocks.

Observation of others' behaviors leads to the increment of the costs of violating the contract but encouraging people to be more diligent means that a higher repayment rate will increase the repayment possibility of other members, resulting in the positive peer effects. "The endogenous peer effects give rise to a multiplier effect of about three judge panel based on our parameter estimates. Our empirical results also highlight the importance of explicitly modeling peer effects and controlling for unobserved group met three-judge panel satirical studies of group lending programs by showing that, without doing so, large inconsistencies could arise in the estimated effects of other variables on repayment decisions." (J. Appl. Econ. (2012)). There are limited. Without effects in the previous effects, since most of the behaviors are determined by the characteristics of people. Nevertheless, previous studies about the endogenous effects in the federal court were assembled by the three judges.

In the previous studies, they found out that panel colleagues can influence the votes. 'This article reanalyzes 11 prior studies of panel voting, as well as three different data sets, and reveals the impact of colleagues' votes to be strikingly uniform. In almost every type of case, each colleague's vote increases the likelihood that a judge will vote in the same direction by roughly 40 percentage points.' (Joshua B. Fischman).

Clearly, in many civil law countries and other courts that require unanimous consent, in 80% of the cases, the judges will agree to all. Therefore, in these previous studies, all the findings can be explained by a strong consensus norm in the circuit court.

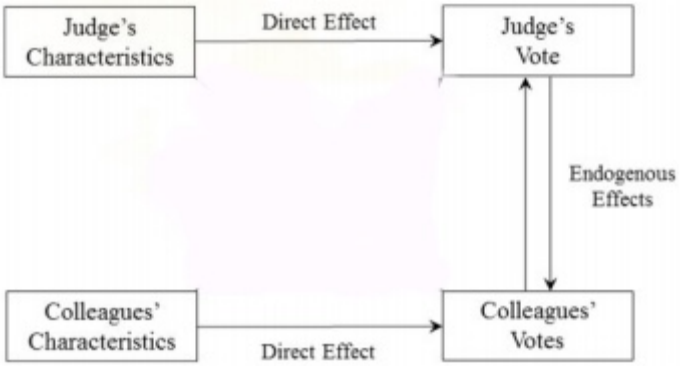

Figure2

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3. Data analysis

The dataset I use for this researching article is by reexamining the data used by Farhang and Wawro, 2016, which are the random sample of 400 employment discrimination cases judged by the Federal Court of Appeals in 1998 and 1999 from 1998 and 1999. Regarding predicting the votes of individual judges, they clarified the impact of the jury level by including a series of variables that indicate the gender, race, and ideological characteristics of the judge's colleagues in the jury. In predicting the outcome of the case, they include the variables indicating that all three judges have different characteristics.

Table one show the descriptive statistics for the variables included the new empirical model. There were dissent cases in the sample, but there is no statistically significant relationship between panels classifies by different gender, ideologies, or different votes.

Equation 1 presents the fundamental equations of this analyzing model and then making explanations about the equations.

In tables 2, 3, and 4, the results of the logit analysis of the judges' votes are shown. For comparison, We only took the samples and data of gender and ideology as variables in the new model. We mainly estimate the votes' influences on other judges' votes.

These are the equations of the model are shown below.

$$V1 = a_0 + b_1X_1 + c_2V_2 + c_3V_3$$

$$V2 = b_0 + b_2X_2 + c_1V_1 + c_3V_3$$

$$V3 = c_0 + b_3X_3 + c_1V_1 + c_2X_2$$

The endogenous effects models assume that the judges are influenced by each other's votes. Consider a panel consisting of Judges a, b, and c who decide the cases.

Let the v1 be one of the dichotomous variables that denote that vote of judges a, where v1=1 represents the liberal decision and v1=0 the conservative one. The same assumption happens to all v variables. Use all other variables which are not V series be the vector or the scalar represent the characteristics of judges' own. In this model, We specifically choose the gender and the ideologies to be the variables, because the source of data has abundant and specific analysis for these data. Finally, let a0, b0, and co be the vector represent the constant for the standard of the equations.

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Variable	Obs	Mean	Std. Dev.	Min	Max
outcome	1,200	.3475	.4763747	0	1
gender	1,200	.1458333	.3530862	0	1
f1	1,200	.03	.1706583	0	1
m1	1,200	.2466667	.4312507	0	1
m2	1,200	.015	.1216031	0	1
race	1,200	.085	.278998	0	1
nw1	1,200	.02	.1400584	0	1
w1	1,200	.14	.3471317	0	1
w2	1,200	.01	.0995402	0	1
dim1	1,200	.1382742	.4931428	-.535	.568
colldim1	1,200	.1382742	.345643	-.51	.568
opauthor	1,200	.3158333	.4650407	0	1
genderauthor	1,200	.05	.2180358	0	1
raceauthor	1,200	.0341667	.1817328	0	1
nomauthor	1,200	.0425008	.2875596	-.51	.568
rclaim	1,200	.2222222	.4156902	0	1
gclaim	1,200	.3277778	.4694017	0	1
hclaim	1,200	.185	.3884595	0	1
ageclaim	1,200	.24	.4272612	0	1
relclaim	1,200	.015	.1216031	0	1
noclaim	1,200	.03	.1706583	0	1
revgender	1,200	.0425	.201811	0	1
revrace	1,200	.025	.15619	0	1
defendant	1,200	.3325	.4713055	0	1
eeoc	1,200	.015	.1216031	0	1
plainappeal	1,200	.7525	.4317396	0	1
bothappeal	1,200	.0925	.2898513	0	1
posture	1,200	.7183333	.4499992	0	1
circ1	1,200	.06	.2375859	0	1
circ2	1,200	.0625	.2421624	0	1
circ3	1,200	.0325	.1773978	0	1
circ4	1,200	.0275	.1636033	0	1
circ5	1,200	.0975	.2967611	0	1
circ6	1,200	.055	.2280753	0	1
circ7	1,200	.2025	.4020304	0	1
circ8	1,200	.19	.3924645	0	1
circ10	1,200	.0775	.2674946	0	1
circ11	1,200	.1025	.3034312	0	1
circ12	1,200	.03	.1706583	0	1

Table 1

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In this endogenous effects model, these characteristics only affect colleagues' votes through the judge's votes, and will not directly affect colleagues' votes. If the model is correctly specified, also means that, if the judge is only affected by the votes of colleagues, and the effect is linear, then no matter which tool is used, the estimated effect should be similar because one limitation of the linear regression model is that the dependent variable is required to be a quantitative variable (fixed distance variable, fixed ratio variable) but not qualitative variable (sequential variable, qualitative variable). Moreover, if certain colleagues' characteristics directly affect the judge's vote, these characteristics will be ineffective instruments, and regression may produce different estimates. Even if the endogenous effect assumption is correct, the equation will draw different conclusions. Moreover, in many practical problems, the dependent variable is often qualitative (categorical variable). For example, in this experiment, V1 will be affected by its characteristics and the votes of the other two judges. Its characteristics need to be quantified into dichotomous variables in the analysis process and belong to vectors. Another problem is that in the endogenous effects model, the V1, V2, and V3 that need to be processed are continuous variables that affect variables in other formulas. In summary, we need to establish a logit analysis model to meet its requirements during the experiment.

Before interpreting the data, We need to be aware that the equation's results should be statistical significance. A p-value of less than 0.05 (typically $\leqslant$ 0.05) is statistically significant. It indicates strong evidence against the null hypothesis, as there is less than a 5% probability the null is correct (and the results are random). A p-value higher than 0.05 (> 0.05) is not statistically significant and indicates strong evidence for the null hypothesis. So, the ultimate goal of this article id to analyze the p-value of the regression model.

Equation 1

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.0165653	0.0100974	1.64055	0.10169
judge1_gender	-0.0289895	0.0282917	-1.02467	0.30615
judge1_nom1	-0.0248220	0.0155950	-1.59167	0.11226
judge2_vote	0.5400855	0.0509984	10.59024	< 2.22e-16 ***
judge3_vote	0.4160885	0.0516397	8.05754	9.3259e-15 ***

Table2

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Equation 2

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.01985119	0.00884013	2.24558	0.025283 *
Judge2_gender	0.00992011	0.01867271	0.53126	0.595536
Judge2_nom1	-0.01089641	0.01361253	-0.80047	0.423920
Judge1_vote	0.40474441	0.03860114	10.48530	< 2e-16 ***
judge3_vote	0.58081845	0.03859655	15.04845	< 2e-16 ***

Table3

Equation 3

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.00135921	0.00986575	0.13777	0.89049
Judge3_gender	0.01696185	0.01774245	0.95600	0.33966
Judge3_nom1	-0.01835943	0.01485824	-1.23564	0.21733
Judge1_vote	0.33537472	0.04210524	7.96515	1.7764e-14 ***
Judge2_vote	0.62270914	0.04176028	14.91152	< 2.22e-16 ***

Table4

The results of the logit model that include the panel judges' compositions (included in the data1) show us the different analyses of the influence of mutual colleagues and direct characteristics. To simplify the model, We only run the data of gender and normative scores, which are the two major influencers in the previous study. When interpreting the dataset, we found out that 384 over a total of 400 cases, which is 96% of the samples, achieve the harmonious decisions. Considering some uniqueness of some cases, we can imply that even some judges might hold their individual opinions, they show the evidence of individualization, then pursuing

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consistent goals. When the gender composition variables are included, we find that the p-value on the gender of the individual judges is not as statistically distinguishable as the previous study. The p-value of gender generally is more significant than the value of statistical significance. The results of the general ideological scores are similar to the findings of the gender compositions. The normative scores in three situations cannot significantly directly affect the votes of judges. However, the interpretation of the p-values of the judges' mutual votes in three equations are mostly multiple times more than other variables. For instance, the equation one, the p-value of the judges2 is 2.22e-16, which is far less than the value of standard statistical significance. The test indicates that the votes are statistically significant in this model, showing the endogenous effects.

To sum up the key results, neither the effects of individualistic gender nor ideology on judges' votes can affect the votes. Other judges' votes can drive the judges' votes on the panel. In some addition, we intend to check whether there is a comparison relationship between mutual characteristics' influences and mutual votes' influences. However, when the problem needs to concern the simultaneous effects of the endogenous and exogenous on the panel, the data set cannot support the analysis process and cannot have statistical significance.

Discussion and conclusion

This paper studies the decision-making of the circuit court from the data of social interaction. It establishes an empirical model of endogenous influence, which more closely reflects the theoretical explanation of group voting. After reinterpreting the results of previous studies, it is found that the voting of colleagues in the group has a significant impact on the votes of other colleagues in the group in various areas of case law. These results show that the group effect can be interpreted as the natural result of the circuit court's consensus norms. The method used here compares the panel effects between data sets and judicial characteristics. However, there are still many problems to be solved; one of the most important is that the causal relationship between variables and results cannot be proved. Statistics cannot prove causality, and statistics can only prove correlation or correlation. In this model, We prove that votes can influence votes in court, but the model is based on assuming that votes can influence each other. Similarly, previous studies have shown that the presence of female judges, or judges from different parties, has an impact on votes. We can not establish a coexistence model of endogenous and exogenous to prove which one is decisive to the votes of judges.

To solve these problems, future work can be based on the framework developed in this paper. Most importantly, group voting research should explore the differences between exogenous and endogenous effects, isolate the interaction of these effects, and assume which causal channels. This kind of research can help us review the specific system design of federal judicial institutions' appeal level and explore the evolution of consistent norms so that we can have a deeper understanding of judicial decision-making. Finally, it can make the judicial system more perfect and fair.

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