Church and State Cooperation: Winners and Losers of the First Vatican Council

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Abstract

I use a rational choice framework to explain a bishop's opposition to the decrees of the First Vatican Council (ca. 1869-1870). The First Vatican Council increased the price of catholic legitimation for states using organized religion to produce political legitimacy. I use historical data to explain the relationships between countries and the Catholic Church to give background about the extent of secular influence the Church possessed in the 19th century. Additionally, I develop a model of church and state cooperation to explain the differences in how bishops voted during the council. I find that bishops who come from Confessional Catholic states, countries that legitimize themselves by establishing Catholicism, gave the least opposition because their rents were the least threatened by the changes by the decrees of Vatican I.

Keywords: Church-State cooperation, Political Economy, Cultural Change

JEL Codes: Z12, N45, O43

1 Introduction

Catholic councils provide invaluable case studies into the development of religious organizations. Only the pope can summon a Catholic council, and the councils are usually convened when the Catholic Church faces significant challenges. The First Vatican Council (ca. 1869–1870) was convened when the Papal States were in a state of decline and secular governments were starting to legitimize their rule separate from religious arguments. Despite the stark institutional changes that First Vatican Council (Vatican I) brought, it is rarely analyzed with the economic toolkit. One exception is Mario Ferrero's game theoretic analysis of Vatican I as a reform game that induces greater adherence among the laity and the clergy to the Vatican (Ferrero 2011). I argue in this paper that rational choice theory explains the institutional changes made during Vatican I. Specifically, the Council was a collective decision by the Church that imposed external costs on a minority of bishops.

On 18 July 1870 the First Vatican Council defined the dogma of papal infallibility. *Pastor Aeternus* affirms the primacy of papal authority over the dioceses and defines the dogma of papal infallibility. The theological elements of these documents are beyond the scope of this paper, but this document changed the possible potential bargains made between the state and the Catholic Church. What is striking about the division within Vatican I is that it did not run along doctrinal lines. With the exception of a handful of bishops, the minority did not deny papal primacy, and few denied that the logic of infallibility followed from it. The minority argued that the definition was inopportune. The dispute arose from the expected consequences of the Council, and the minority bishops made clear their concerns that *Pastor Aeternus* would make the ordinary work of a diocese harder in the countries they governed. Although the pope wields considerable influence within the Church, he alone could not pass this decree. This raises the question about why most bishops supported the proclamation of these decrees, while a minority vigorously opposed them. What made a bishop oppose the decrees of Vatican I?

To answer this question, I draw upon the literature in the economics of religion, particularly Anthony Gill's model of church and state cooperation (Gill 1998). To buttress Gill's framework, I use the literature defining ideology as a set of beliefs and norms that mitigate uncertainty about political and religious leaders (North 1981; Benabou and Tirole 2016; Kuran 1994; Stark and Bainbridge 1985; Anderson and Tollison 1992). I discuss the role of religious organizations as propagating agents for state legitimacy (Rubin 2017; Greif and Rubin 2024). I contribute to the literature explaining the institutions that religious organizations adopt (Iannaccone 1998; Iyer 2016; Gill 2021; Gauthier 1986; Stark and Finke 2000; Whitener and Salter 2022). Due to the importance of church and state relations during Vatican I, I use the literature of religious market structure to explain the importance of religious competition on the decision-making of religious

leaders (Anderson et al. 1992; Ekelund et al. 2005). Particularly, I focus on the role of religious competition on government restrictions of religion (Finke 2013; Finke and Martin 2014; Epstein 2018). I contribute to the smaller literature of the economic analysis of Catholic councils (Ferrero 2011; Wilde 2007; Wilde et al. 2010). Although focusing only on the Catholic Church, other scholars have analyzed the role of legitimacy in religious organizations (Coşgel and Miceli 2009, 2019), and I believe this framework can be used to explain religious institutions generally.

To explain the changes brought about by *Pastor Aeternus*, I model the state as a cost-minimizing producer of citizen compliance that purchases legitimation from religious suppliers. *Pastor Aeternus* raised the price of Catholic legitimation. The price increase was common to every state, since the change in the Church's constitution was the same everywhere. The price increase's incidence, however, was not. To identify this incidence, I focus on the national characteristics of the minority opposition bishops. I define a market for religious legitimation for governments in late 19th centuryI do not contend that these decrees were effective at proliferating Catholic legitimacy as the basis of political legitimacy for the various political regimes, but I argue that the pope perceived that most dioceses resided in Catholic countries where Catholicism represented a marginally more productive ideology for the state.

I organize the paper as follows. Section 2 covers the historical background of Vatican I and emphasizes the national characteristics that relate to the market of Catholic provided political legitimacy. Section 3 clarifies the theoretical model employed in this paper. I clarify the incentives that motivate church and state cooperation. I define a market for Church provided legitimacy, where governments are the consumers and the Church is the supplier. I focus on how the structure of this market affects a bishop's willingness to be a part of the minority opposition. Section 4 describes the data. Section 5 provides the empirical specification and presents the empirical results of bishop opposition on relevant national characteristics. Section 5 concludes.

2 Historical Background

This section focuses upon three elements of Vatican I. First, what Vatican I actually did. *Pastor Aeternus* was the main source of contention during the council, as papal infallibility was expected to change how a bishop was able to interact with his government. Second, the bishops present at the council held strong expectations about whether they would gain or lose from the Council, seen through the initial debate over the procedure and voting rules. I construe the minority's failed attempt to impose a unanimity voting rule as the opposition bishops attempting to reduce the expected external cost of *Pastor Aeternus* (Buchanan and Tullock 1962). Third, after a majority rule was adopted, the minority opposition objected based upon how *Pastor Aeternus* would cause secular governments and people to abandon and persecute the Church.

The minority labeled the council "inopportune" instead of labeling the doctrine discussed as false.

2.1 What Vatican I Did

Pius IX became Pope on 16 June 1846, and his papacy initially supported Liberal reform within the Catholic Church. But, after the Revolution of 1848 when a liberal movement caused Pius IX to flee Rome after his minister of justice was assassinated, Pius IX became extremely skeptical of Liberalism. In the following years, the Vatican blamed liberalism and rationalism for the decline of its political allies and for the increasing secularism in non-Catholic governments. Conservative Catholics expressed dismay over their age when considering the need for an ecumenical council: "The special character of this Age is the tendency of a dominant party of men to destroy all the ancient traditions ... and to erect ... a new order, founded on natural reason alone" (Manning 1877, p. 5). The Vatican perceived that their decline in secular influence was in large part due to the rise of competing ideologies in place of Catholicism. The Catholic Church's remaining secular influence depended upon two factors: 1) whether the population is largely Catholic and 2) whether the government uses Catholicism to legitimize its rule.

Pius IX hoped to elevate papal infallibility to a dogma with Vatican I. Papal infallibility is the theological belief that the pope cannot commit error when speaking formally (*ex cathedra*) on faith and morals.[1] Pius IX perceived widespread support for papal infallibility after the positive reception for his definition of the Immaculate Conception, raising it to a dogma within the Church, in 1854 and for his publication of the "Syllabus of Errors" that condemned liberalism, rationalism, socialism, and religious freedom in 1864. In 1865, Pius IX sent letters to the Roman Cardinals and many of the important archbishops around the world to gauge support for papal infallibility and a council. The vast majority approved of both, but a small minority "doubted if the moment were opportune" (Manning 1877, p. 8).

Not all Catholic bishops shared the view of the conservative Vatican. One Italian bishop notes in his memoirs about the council that "the Roman Curia is furnished with infinite moral and material forces," but "it stands detached from the ordinary interests of life" (Nobili-Vitelleschi 1876, p. 239). To resolve this discrepancy, the "separation of Church and State" stands as the "only logical solution of the eternal and difficult problem" (Nobili-Vitelleschi 1876, p. 90). The objection of liberal Catholics was that the scheme of Vatican I "failed to render it serviceable to the living institutions and practical interests of the day, though [the theologians] made it closely accord with the ideal of their minds" (Nobili-Vitelleschi 1876, p. 90). The conservative and liberal split within the Catholic Church then roughly characterizes the divide in Vatican I between the mostly conservative majority and minority liberal opposition.

[1] This is the current definition of papal infallibility that was adopted by the Catholic Church. However, it should be noted that less restricted definitions of papal infallibility were considered during the council but failed to achieve enough support.

A glance at the composition of the minority opposition reveals some insight into the factors that motivated their disagreements. The countries that had no bishops formally supporting the minority opposition were from Spain, Portugal, Belgium, Holland, and Central and South America (Kirch 1912). The minority opposition on the other hand was represented by "most of the German and Austro-Hungarian members, ... as well as nearly half of the American and one-third of the French." (Kirch 1912). The minority was represented by bishops who tended to live in countries with a stronger belief in secularism and larger Protestant populations. The concerns of the minority bishops were twofold. First, doubling down on papal infallibility would give the enemies of the Church "a most unfavourable idea of a religion thus intolerant and aggressive" (p. Nobili-Vitelleschi 1876, p. 83). Second, the decrees of Vatican I harm the goal of the Church by casting out "Governments and nations out of the Church" that would otherwise be sympathetic to it (Nobili-Bitellschi 1876, p. 84).

The debate between the majority and minority parties of Vatican I raises a question as to why? Especially, since the theological components of papal infallibility and the substance of the condemnations of secularism were not contested. Instead, practical matters about everyday administration dominated the minority opposition's agenda. They perceived that the decrees of Vatican I fostered greater violence against the Church and made their jobs of reaching marginal converts more difficult.

2.2 The Decision Rule of Vatican I

Before the Council debated papal infallibility, it debated how to decide. The Council's procedures were set by the pope before the bishops convened and then were revised twice, each time in a direction that made a simple majority more decisive. The order created four deputations on faith, discipline, religious orders, and Oriental rites and missions. The general congregations would refer schemas for revision. Because the deputation on faith would handle any definition of papal infallibility, its composition determined who would draft and amend the text the Council eventually voted on. The election for who would be on the deputation of faith was held on 14 December 1869 under a plurality rule. The majority party filled all twenty-four spots, while the minority had elected no one. A minority comprising roughly a fifth of the Council thus obtained no representation on the body that would control the drafting of the text concerning papal infallibility.

Another revision came when the pace of discussions proved unsatisfactory to the majority. The decree Apostolicis litteris of 20 February 1870 required that objections to a schema be submitted in writing to the relevant deputation rather than argued on the floor and permitted debate to be closed on the motion of a sufficient number of fathers. Both changes shifted control from the assembly to the deputations the minority had failed to enter, and from open-ended discussion to a majority's ability to end it. It was against this

revised order that the minority framed the protest examined below:

> As it was impossible to obtain unanimity in the Council, it was necessary to be content with the vote of the majority, this last being, in fact, already so well organised and homogenous, that full trust might be placed in it. Moreover, this was the most obvious and legal means of subduing the Opposition. Accordingly, by the new Order everything was left to the judgment of the majority, and this arrangement gave great importance to a clause which could prejudge to the detriment of the interests of the Opposition one of the gravest questions before the Council, that, namely, of the necessity of unanimity in its decisions. The Immediate danger for the Opposition, under the new Order, was that, by the aid of its provisions, the Infallibilists might, within a week, arrest the discussion on the scheme "De Ecclesia," vote its acceptance, and present it to the Pope for his approbation. (Nobili-Vitelleschi 1876, p. 110)

Under the revised order of proceedings, discussion could be closed and questions carried by simple majority. The minority objected, and their protest was procedural rather than doctrinal. They demanded three things: "1st. The abolition of the limits of time imposed on the study and discussion of the schemes. 2nd. The creation of a mixed Commission, in which controverted points might be orally debated before being altered. 3rd. That all decisions should depend, invariably, not on the vote of the majority, but on the moral unanimity of the Fathers." (Nobili-Vitelleschi 1876, p. 125).

The third demand is the one that matters the most. A collective body choosing a decision rule faces a tradeoff between the external costs a winning coalition can impose on those excluded from it and the decision-making costs of reaching agreement (Buchanan and Tullock 1962). A minority that expects to lose prefers a rule approaching unanimity, because unanimity drives its expected external costs to zero. That is what the minority asked for, and under such a rule the definition could not have been carried at all. Although the minority bishops did not phrase their objections explicitly in these terms, their attempts to prevent a more lenient majority rule during the council demonstrates their expectation that they would suffer losses at the hands of the majority. Conversely, the majority's willingness to push through these rules and proceedings demonstrates that these bishops expected to gain from a definition of papal infallibility.

The fierce debate over the Council's agenda, discussion, and voting rule show that the bishops understood that there was an expected distributional conflict. Bishops fought over the rule before they fought over the doctrine, which they would have had no reason to do unless they anticipated which side of the rule they would fall on. Second, the majority's refusal to raise the voting rule to unanimity is evidence that these bishops expected to be the winning coalition. The Council was thus a collective decision under a majority rule, adopted over the objection of those who anticipated bearing its costs. The question is which bishops

benefited and which lost.

2.3 The Minority Opposition's Objections

Once the order of business was fixed and the deputations seated, the minority's opposition largely conceded the doctrine but contested its expected reactions from "nonbelievers, schismatics, Protestants, and believers weak in their faith" (O'Gara 1988, p. 109). The minority opposition referred to their position as inopportunism. The minority opposition focuses on the expected negative consequences that the council would bring on identifiable parties of bishops.

The minority's own petition against bringing the definition forward states the objection in exactly this form:

> Furthermore, since we are an episcopal see among the most important Catholic nations, we are familiar with the daily state of affairs among them; But we are certain that the definition that is being demanded will provide new weapons to the enemies of religion to arouse envy of the Catholic cause even among men of better reputation, and we are certain that in Europe at least it will provide the governments of our regions with a loophole or a pretext for encroaching on the remaining rights of the Church. (Mansi 1926, p. 678–79)

The same reasoning appears throughout the minority's writings that a dogmatic definition would "cast Governments and nations out of the Church" (Nobili-Vitelleschi 1876, p. 84) and would give the Church's opponents "a most unfavourable idea of a religion thus intolerant and aggressive" (p. 83).

These anticipations were not merely speculative. Governments said the same thing in advance and in writing. The North German Confederation warned the Holy See that proceedings would be taken against Prussian bishops who accepted the documents produced from the council (Nobili-Vitelleschi 1876, p. 154). Bavaria attempted to convince other countries to protest "against all unilateral decisions by the council" due to the "threat it posed to existing church-state relations." (Noether 1968, pp. 230–31).Austria protested "the possible invasion of state's rights implied in the council's schema" (Noether 1968, p. 232). The French government insisted "on being informed of them and on presenting its views before any decisions were reached" (Noether 1968, p. 232). These are examples of a state announcing in advance that it would renegotiate its policy towards the Catholic Church, viewing the potential changes from the Council as damaging to the compliance of its Catholic citizens.

The minority understood itself to be the losing party to a collective decision. It had contested the decision rule and lost. It then contested the substance on the ground that the Council's action would reduce what its members' sees received from their governments. Once papal infallibility was defined, the minority bishops

submitted. The pattern is that of a minority that expected to bear costs, failed to prevent the decision, and complied once compliance was the only remaining option. Which bishops those were is the question the rest of this paper takes up. The minority's own account identifies the relevant variation as national. Their objection was that the definition would damage relations between their sees and their governments.

3 Theoretical Section

This section explains the objectives of both the state and church and the conditions in which they will cooperate. States attempt to minimize their cost of ruling and use ideology when it can to acquire citizen compliance. The Church attempts to maximize revenue and pursues government support to acquire revenue. When these objectives dovetail between church and state, they engage in mutually beneficial cooperation. In this market, political leaders seek the ideological legitimacy that a religion provides in order to bolster citizen compliance with the state, while church leaders seek material support and protections (resources, rents, and restrictions on rivals). The "price" of legitimacy is reflected in the concessions or support a government must give the Church in return for its endorsement. The state establishes a religion in return for its support.

When a government and a bishop strike a deal, it reflects a market equilibrium for legitimacy. The state's willingness to pay meets the bishop's willingness to provide legitimacy, which yields a cooperative arrangement through political exchange. In equilibrium, both sides gain: the state achieves citizen compliance more cheaply than it would through alternative means, and the bishop increases the revenue generated from his see under state support. The exact quantity of legitimacy bought depends upon the relative marginal productivity between the Church's ideology and other ideologies. The literature on Church and State cooperation focuses on religious competition motivating the incentives of both the Church and the state (Chaves and Cann 1992; Chaves and Gorski 2001; Hamberg and Pettersson 1994). Religious competition in this context results in a greater number of substitutes for the state.

If a regime has alternative sources of legitimacy besides the Catholic faith, such as a competing religion, a strong nationalist ideology, or a secular creed like liberalism, then its reliance on Catholic legitimacy will be lower. Formally, When more secular or non-Catholic alternatives exist, the demand for Catholic legitimacy is more elastic, and the state can more easily substitute away to those alternatives. For instance, 19th-century European states influenced by Enlightenment rationalism or Protestantism had viable non-Catholic bases for legitimacy, making them less dependent on Catholic establishment. By contrast, in regions like Latin America where Catholicism was overwhelmingly dominant and secular ideologies were weak, governments faced no real substitutes for Church-provided legitimacy, giving the Church greater leverage. Governments purchase the compliance effects of religious endorsement among subpopulations. A state like Prussia governed

both a Protestant majority and a substantial Catholic minority. Prussian legitimacy derived in part from Protestant institutional support in the north and in part from Catholic acquiescence or active episcopal cooperation in the south. The mixed bundle was not a single coherent ideology but a portfolio of separate legitimation relationships with distinct religious communities. Similarly, France's political legitimacy rested on republican and rationalist principles for much of the urban and intellectual population, while the Catholic Church remained central to social order in the rural departments. The state's "consumption" of Catholic legitimacy operated alongside but did not blend with its consumption of secular Enlightenment ideology.

Critically, Vatican I threatened the institutional viability of pre-conciliar bundles and not their theological coherence. Before the Council, bishops in mixed-portfolio states could exercise pragmatic discretion, cooperating with governments that also patronized Protestant institutions without facing formal sanction. Vatican I's decrees changed that by increasing papal authority over the bishops bargaining decisions. In summary, political leaders behave like consumers in a market by purchasing legitimacy from the Church to minimize the total cost of governance. Their demand curve for church legitimacy slopes downward. If the Church's support becomes too expensive, then rulers reduce their reliance on it and turn to other means of securing compliance. When church legitimacy is highly effective, states are willing to grant more privileges to the Church, which is in effect employing a larger quantity of a Church's legitimacy input, because the return in social order is worth it. More established churches thus provide more *bang for their buck* in terms of obedience, raising the state's willingness to buy legitimacy from them.

The level of establishment varies in its intensity, and states choose to establish a Church depending on that religion's productivity in securing compliance. The marginal productivity of church-provided legitimacy in securing compliance determines how much a state is willing to pay for religious establishment. The following sub-sections outline the incentives on both sides of this exchange, then examine how Vatican I's decree *Pastor Aeternus* increased the price of Catholic legitimacy. The price increase was uniform across states, but the incidence of the price shock varied around a state's production function for legitimacy. Incidence varies by two parameters: the share of the state's legitimation budget already going to Catholicism, s_R, and the ease in which the state could substitute toward a rival supplier, σ. The first parameter affects the state's cost in employing Catholicism, while both parameters determine whether the bishop gains or loses.

3.1 The State and Bishop Exchange

Historically, cooperation between church and state has been the norm, where the state gives up resources to the Church. This is costly for the state, so it must be gaining something to compensate for those forgone resources. Within this framework, political authorities are modeled as firms producing citizen compliance.

Legitimacy operates through belief. If citizens accept the ruler's authority as legitimate (possibly due to religious sanction), they are more likely to obey laws voluntarily. Scholars suggest that ideology is an effective mechanism for minimizing the cost of rule (Benabou and Tirole 2016; Kuran 1994; Stark and Bainbridge 1985; Anderson and Tollison 1992). Rational political leaders therefore demand religious legitimacy insofar as it increases compliance at lower cost than the secular alternatives. The marginal product of legitimacy in a state's compliance production function determines how willing a state is to "buy" legitimacy from a church. A cost minimizing state employs an optimal input mix of legitimation from the various legitimating agents that bid for the state's resources. Legitimacy is not a homogeneous input. A state acquires it from identifiable suppliers, e.g., a national Catholic hierarchy, an established Protestant church, a state cult of the nation, each of which must be paid in concessions. The state chooses how much of its legitimation budget to direct to the Catholic hierarchy rather than to rival suppliers. Generating legitimacy resembles a production function:

$$L = f(R, A) \tag{1}$$

Where R is legitimation supplied by the national Catholic hierarchy and A is legitimation supplied by the state's best available alternative. Each input carries a price. The price of Catholic legitimation, P_C, is the flow of concessions the state surrenders: clerical salaries and building funds, tax exemption, a role in schooling and civil registration, deference over appointments, and forbearance from regulation imposed on other bodies. P_A is defined symmetrically. A state minimizing the cost of a given level of compliance chooses R and A conditional on these prices. Two parameters affect the state's response to a price change. First, Catholic cost share:

$$s_R = \frac{P_R R}{P_R R + P_A A} \tag{2}$$

Equation (2) gives the fraction of the legitimation budget going to the Catholic hierarchy. Second, elasticity of substitution[2], σ, between R and A:

$$\sigma = \frac{dln(A/R)}{dln(P_R/P_A)} \tag{3}$$

This parameter captures how easily a state can replace Catholic legitimation with alternative sources of

[2]Im using the Hicksian elasticity of substitution, which holds output constant, so the state is staying on the same isoquant after the price change. At $\sigma = 0$, the mix is technologically fixed and Catholic legitimation has no replacement at any price; as $\sigma \to \infty$, the state is indifferent between suppliers, assuming the same marginal productivity between both inputs (Hicks 1932). The elasticity is conditional on legitimacy, $\bar{L}$, and so carries no scale effect; on elasticities of substitution and derived demand see Mundlak (1968)

legitimation. The analysis takes P_R as given.

On the other side of the exchange, the operative unit is the diocesan bishop and not the universal Church. It is the bishop of Cologne, not the pope, who delivers legitimation to the Prussian state through pastoral cooperation, public endorsement, and the management of Catholic civil compliance; and it is to his see that the state concessions primarily flow. I model the bishop as the residual claimant on the rents his see extracts from the state:

$$Rent_i = P_R R_i = TR_i \tag{4}$$

Where rents include in-kind privileges, such as the church's role in education, tax exemptions, or a monopoly in the religious marketplace, which are valued at what the state forgoes in granting them.[3] Two features of the bishop's position matter when predicting his opposition during the Council. The bishops before 1870 operated more autonomously from Rome, granting the bishop more flexibility when bargaining with the state, even when against the wishes of the papacy. And the bishop's tenure, in mostly Catholic states, was decided or influenced by the state's appointments. For example, Span's and Latin America's patronato, Portugal's padroado, the Austrian Concordat of 1855, and the French Concordat of 1801 allowed the government to influence the appointment of bishops.

Within these constraints, bishops have clear incentives to cooperate with states that can provide resources and favorable conditions. The bishop supplies legitimacy to the state by endorsing the ruler's right to govern, and in return the state can grant the Church financial resources and rents, legal privileges, or restrictions on religious competition. Historically, Catholic leaders often sought religious establishment precisely because it created a protected monopoly, allowing them to extract greater rents and loyalty than in an open religious marketplace (Ekelund et al 1996; Andersen and Tollison 1992; Ekelund, Herbert, and Tollison 1989).

3.2 Incidence of *Pastor Aeternus*

Pastor Aeternus was promulgated on 18 July 1870. It defined papal infallibility as a dogma, which affirmed a papal supremacy of universal and immediate jurisdiction over every see. Papal primacy changed the terms on which a government could contract for Catholic legitimation. Before July 1870, the state contracted with a more autonomous bishop. After that, that same bishop's authority stood formally subordinate to a Roman superior. In the notation of this paper's model, the price of catholic legitimation, P_R, increased, and it rose in the same proportion everywhere, because the Church's constitution was the same everywhere. What

[3]This is revenue maximization stated at the level at which the exchange occurs. I assume for the time being that the bishop's marginal cost of supplying legitimation is low, since pastoral administration and political administration are largely joint products of the same diocesan apparatus, so rent should move closely with revenue.

varied across states was each country's expenditure share of catholic legitimation, s_R, and the elasticity of substitution between Catholic and non-Catholic legitimating inputs, σ.

A proportional increase in P_R falls on two margins. Both follow from a single differentiation of the state's cost minimization problem:

$$\min_{R,A} P_R R + P_A A \ s.t. \ \bar{L} = f(R, A) \tag{5}$$

From this problem, the own-price elasticity of the state's derived demand for Catholic legitimation, holding legitimation output fixed, is equation 6 [4]:

$$\eta_{RR} = \frac{dlnR}{dlnP_R} = -\sigma(1 - s_R) \tag{6}$$

The two parameters are distinct and multiplicative. The elasticity of substitution, σ, is the state's willingness to shift the mix, and $(1 - s_R)$ is the room to shift. A state whose legitimation budget is almost entirely Catholic has a rival input so small that even a large proportional expansion of it absorbs almost none of the adjustment, so R barely moves however substitutable the two suppliers are. Both terms must be large for $|\eta_{RR}|$ to be large.

The state's burden from the price change is proportionate to s_R. Taking the state's legitimation expenditure and differentiating it with respect to the price of Catholic legitimation changes the state's cost by exactly the state's current amount of catholic legitimation:

$$\frac{\partial lnE}{\partial lnP_R} = s_R \tag{7}$$

This means that for small increases in the price of Catholic legitimation while holding the output of legitimacy fixed, then countries who buy primarily Catholic legitimation see the largest increases in their expenditure. Rearranging equation (7) and equation (6) identifies the state's burden and bishop's burden of Vatican I, respectively:

$$dlnE = s_R * dlnP_R \tag{8}$$

$$dlnR = -\sigma(1 - s_R)dlnP_R \tag{9}$$

Equation (8) shows that, in the short-run, a price increase always increases the amount of expenditure

[4] For the proof of this derivation see the Appendix

necessary to achieve the previous amount of output. From the state's perspective, Vatican I makes all states worse off in proportion to their currently employed amount of catholic legitimation. From the bishop's perspective, they benefit more when the state currently purchases a larger proportion of Catholic legitimation. Additionally, unlike the state, whether or not Vatican I benefits or harms a bishop is ambiguous. The threshold between benefit and harm for a bishop is determined by the own-price elasticity of catholic legitimation. An elastic own-price elasticity results in a bishop being made worse off, as the state's substitution away from catholic legitimation offsets the gains from the price increase. An inelastic own-price elasticity results in a bishop being made better off. The threshold can be expressed entirely in s_R with the condition that a bishop is indifferent at $\sigma^* = \frac{1}{1-s_R}$, made better of when $\sigma^* < \frac{1}{1-s_R}$, and made worse off when $\sigma^* > \frac{1}{1-s_R}$

Equation (10) gives the quantity contraction and price increase for the bishop. Putting the bishop's rent value equation into logs and substituting in equations (6) gives the change in a bishop's rents:

$$d[lnRents_i] = dlnP_R + dlnR = (1 + \eta_{RR})dlnP_R = [1 - \sigma(1 - s_R)]dlnP_R \tag{10}$$

Crucially, this framework predicts variation in church-state relations across countries. In a highly religious polity with few secular alternatives, Greater church-state integration (higher share of church legitimation employed) with significant state support for the Church is expected. In more secular or pluralistic polities, church and state agree to a looser arrangement, where the state can replace or do without that Church's legitimacy more readily. These different pre-conciliar agreements set the stage for how church leaders perceive reforms. Anything that threatens to change the employment of a Church's legitimacy (from the state's perspective) will be opposed more by those in more pluralistic societies than highly religious polities. This insight is central to understanding the split at the First Vatican Council.

In summary, viewing the First Vatican Council through a market for legitimacy lens demonstrates the exchange incentives at play. Political leaders demand church legitimacy up to the point it cost-effectively boosts compliance, and church leaders supply it in return for resources and regulatory favors. The Council's doctrinal changes (particularly *Pastor Aeternus*) effectively raised the price of Catholic legitimation as an input in the state's production function of compliance This shock impacted churches in countries with mostly Protestant and mixed combinations of ideological inputs. Consequently, a bishop's stance at Vatican I can be explained by self-interest under doctrinal change. This rational choice framework thus predicts the observed pattern of cooperation and opposition, enriching our understanding of church-state dynamics during Vatican I.

3.3 Theoretical Framework

The incidence result of section 3.2 turns on two parameters, s_R and σ. The framework for applying this model to Vatican I is captured in Table 1. I simplify combinations of the two parameters of interest to classify a state's bundle of legitimating agents. I draw a distinction between a state that expends a larger share of its legitimation budget on catholic legitimation, s_R. The other distinction describes whether catholic legitimation is substitutable with other legitimating agents. The GRP data, described in the next section, gives me an index for the state's favoritism of various religions, which I use to represent the equilibrium outcomes of church and state cooperation before Vatican I. From these outcomes, I infer the substitutability of inputs and use the index measure to calculate the share of catholic legitimation using the below equation:

$$s_R = \frac{\text{Catholic Preference}}{\text{Catholic Preference} + \text{Alternative Preference}} \tag{11}$$

I use this framework to classify the church and state arrangements for states in 1870. Figure 1 displays four quadrants containing countries that represent different exchange outcomes.

	High s_R	**Low** s_R
High σ	**(1)** High s_R High σ	**(2)** Low s_R High σ
Low σ	**(3)** High s_R Low σ	**(4)** Low s_R Low σ

Table 1: Catholic expenditure share and ease of substitution. Given these parameters, certain agreements between church and state will be optimal

Quadrant 1 is the positive parity regime where the state maintains established relationships with Catholicism and with a rival confession simultaneously, extending benefits to both legitimating agents. Quadrant 2 is an alternative establishment regime, where the state privileges the rival confession while withholding support from, or restricting, Catholicism. Quadrant 3 is the confessional Catholic regime, where Catholicism is the preferred religion and the nearest rival is actively restricted. Quadrant 4 is the negative parity regime, where the state restricts both Catholicism and its nearest rival, relying on neither for legitimation. One distinction

to explain is that quadrants 1 and 4 are both parity regimes. They differ in the level of religious legitimation employed but not in their composition. Because s_R is a share rather than a level, a state that supports both confessions and a state that supports neither occupy the same position on the Catholic expenditure share; they differ only in σ. Conversely, quadrants 2 and 3 hold the level of religious legitimation roughly fixed while varying its composition, and so differ in s_R while sharing similar σ. The classification in Figure 1 is stated in the model's parameters, neither of which is directly observed. However, section 5 constructs empirical counterparts from indices of state religious preference and returns to this figure.

Each diagonal of Table 1 therefore isolates one parameter. Quadrants (2) and (3) vary the Catholic share with substitutability roughly constant; and quadrants (1) and (4) vary substitutability with the share roughly constant. Quadrant 2 combines the largest $(1 - s_R)$ with a high σ and should exhibit the greatest quantity contraction; quadrant 3 combines the smallest $(1 - s_R)$ with a low σ and the least. Between the parity cells, there is an ambiguous effect between σ and $(1 - s_R)$, whichever effect dominates determines whether quadrant 1 should contract more than quadrant 4. However, in the data, s_R will be roughly the same between quadrants 1 and 4, so differences in σ will dominate, leading me to predict that quadrant (1) will be larger. Additional reason to believe so is that a functioning rival establishment lowers the cost of shifting weight onto it while a state patronizing neither confession has no developed religious supplier to substitute toward. The model therefore predicts a quadrant ordering of (2) > (1) > (4) > (3).

4 Data

I draw data from the Association of Religious Data Archive (ARDA) to cover national characteristics on government employment of religious legitimacy and religious demographics. I use two datasets from the Religious Characteristics of State Data Project (Brown 2020; Brown and James 2019): 1) Government Religious Preference 2.0 (GRP) and 2) Religious Characteristics of States-Demographics 2.0 dataset (RCS). The literature has used the U.S. State Department's International Religious Freedom Reports (Grim and Finke 2006; Finke 2013; Finke and Martin 2014). However, U.S. state department data does not exist for countries in 1870, so I draw upon the GRP and RCS datasets for historical measures going back to at least 1800.

Brown (2016) uses the original GRP dataset to proxy the prevalence of religious ideology in government and its effect on various religions' response to initiate conflict. The GRP dataset measures government favoritism and disfavoritism for 30 religious denominations, ranging from Christian, Jewish, and Islamic sects to Buddhist and local ethnic religions in Africa and South America. A higher index score for a religion indicates greater government support for that religion.

The GRP dataset creates a composite index measure from five main areas of government favoritism: Official Status, religious education, financial support, regulatory burden, and freedom to exercise. Official status captures the existence of a state religion (if any) and any special privileges tied to that legal status. Religious education captures if religious education is required or can be opted out of. Financial support represents the subsidies or tax exemptions going to a religion and if these privileges are equitably enforced or favoring a single religion. Regulatory burden captures whether all religions face the same regulations or if some religions face harsher or lighter burdens. Freedom to exercise asks if religious practice is required or if there are restrictions to public and private worship of a religion. I use the GRP index to proxy a state's employment of a religion. Importantly, a state's index measure captures the outcome of the exchange between church and state. A higher score indicates a greater amount of government resources allocated or surrendered to a religion. With GRP index, I can proxy the shares of legitimation that are being derived by cooperation with Catholicism and other religious legitimation suppliers.

The RCS dataset is made to be easily merged with the GRP datasets and provides controls for the size of religious groups. Both the GRP and RCS collect observations at the national-level, and I have data for 24 countries in total.[5] Finally, I created a dataset of bishop opposition during Vatican I that I compiled from volume 51 of Sacorum Conciliorum Nova et Amplissima Collectio (Mansi 1926). Mansi (1926) is a collection of documents, decrees, and acts of councils of the Catholic Church. Mansi (1926) gives a record of the propositions brought up for discussion during the Vatican I. Importantly, it gives data on various propositions that bishops supported or opposed relating to the discussion of papal infallibility and the constitutions of the Council.

I have individual bishop-level voting records for approximately 500 bishops compiled from Mansi (1926). However, the key explanatory variables, government religious preference and the covariates of religious population shares, vary only at the national level. I aggregate bishop opposition during the council to the national-level by matching their respective diocese to the country it was within in 1870. I conduct this aggregation to match the granularity of the covariates with the outcome. Combining these three datasets, I have proxies for government employment of religious ideology, religious competition, and bishop opposition.

5 Empirical Framework

The model in Section 3 treats Catholic legitimation and its nearest rival as substitutable inputs into the production of legitimacy. Before classifying states, I ask whether the two proxies behave that way in the

[5]The appendix provides a list of the countries included in the data. It is important to note that several historical countries are used in this data, such as Austria-Hungary, Prussia, Ottoman Empire, etc. See Appendix for how these historical countries are classified

cross-section. Figure 1 plots each state's Catholic favoritism against its favoritism toward the highest-scoring alternative religion, with reference lines at 2.0 on both axes marking the value when government favoritism takes a neutral stance towards a regulation, neither regulating nor subsidizing.

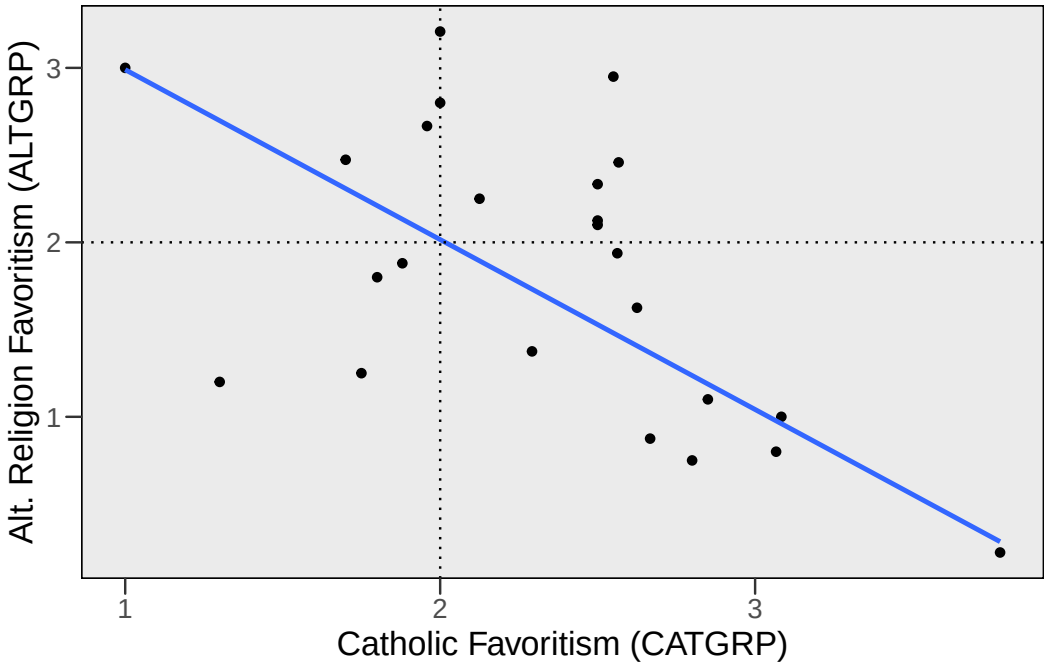

Figure 1: Catholic government preference and the best alternative religious legitimation, 1870

Notes: Each point is one of the 24 states in the estimation sample. The horizontal axis is Catholic government preference (CATGRP); the vertical axis is the highest government preference score among all non-Catholic traditions in GRP 2.0. Dotted reference lines mark the value of 2.0, which the GRP codebook designates as state neutrality toward a religion. The solid line is an weighted linear fit. Both indices are bounded on the same 0–4 scale and are constructed separately for each tradition, so nothing in their construction prevents a state from scoring highly on both.

The relationship is negative, suggesting substitution between religious legitimation in 1870. States that extend substantial support to the Catholic hierarchy tend to extend less to the next-ranked confession and vice versa. The pattern is what one expects if governments allocate a unique stock of establishment privileges, such as official status, an educational role, financial support, exemption from regulatory burden, across competing religious suppliers. The reference lines partition the sample into four regions, and states are distributed across all of them: a group in the upper-right supporting both confessions, a group in the lower-left supporting neither, and two off-diagonal groups privileging one over the other. These are the regimes the model distinguishes.

Table 2 classifies the 24 states in the estimation sample by splitting each index at 2.0 and reports the bishop-weighted mean opposition rate within each cell. The cut is selected to fit at index's definition of the point at which a state neither favors nor disfavors a religion. Section 3.3 predicts the partial order (2) >

(1) > (4) > (3). Quadrant 2 shows the countries with the largest room to substitute with a developed rival supplier already in place, and should therefore show the greatest opposition from the bishops. Quadrant 3 contains the countries with the least room with no developed rival, and should show the least bishop opposition. The two parity cells share a Catholic expenditure share near one half and are not ranked against each other by the model.

Table 2: Episcopal opposition by legitimation regime, full sample

Alternative religious legitimation	Catholic government preference (CATGRP): Strong	Catholic government preference (CATGRP): Weak
Strong	(1) Positive parity Unweighted 40.0% Weighted 41.1% (Bavaria, Belgium, Canada, France, Switzerland, Württemberg)	(2) Best alternative Unweighted 29.5% Weighted 24.2% (Germany, Greece, Persia, Ottoman Empire, UK)
Weak	(3) Confessional Unweighted 11.4% Weighted 13.7% (Argentina, Austria−Hungary, Brazil, Chile, Italy, Papal States, Portugal, Spain, Uruguay)	(4) Detached Unweighted 15.0% Weighted 43.8% (Mexico, Netherlands, USA, Venezuela)

Note: cell entries are mean episcopal opposition to papal infallibility. Unwtd. is the unweighted mean across states; Wtd. weights each state by its delegation size. Both indices split at the midpoint of the 0−4 GRP scale.

Notes: Cell entries are mean episcopal opposition to papal infallibility. Unweighted means average across states; weighted means weight each state by the number of council fathers with a recorded vote. Both indices are split at 2.0, the midpoint of the 0–4 GRP scale and the value its codebook designates as state neutrality. The sample comprises 24 states, excluding those represented only by vicars apostolic and those without GRP coverage.

While showing both weighted and unweighted means, I use the weighted means as the primary results. I do this because the number of bishops is roughly proportional to the size of the Catholic Church, and contemporaries of the Council complained that Vatican I was a European council, where the overwhelming majority of bishops came from European countries (335 European vs 113 non-European bishops in this sample). Because representation was unbalanced between countries, weighting captures the importance of more influential Catholic countries, where marginal changes would have their largest effects.

The observed ordering is (4) 43.8% > (1) 41.1% > (2) 24.2% > (3) 13.7%. Here I find that positive and negative parity regimes have greater opposition than either kind of confessional state. Although, bishops

in Catholic confessional states do have the lowest opposition. The model predicts some ambiguity with the ranking of these parity states due to the data not estimating a measure for σ. Table 2 reports the same classification but excluding Greece, Persia, and the Ottoman Empire. I cut these countries because they lack a sizable Catholic population, they all have less than 3 percent of their population as Catholic; the Catholics in these countries are mostly Eastern rite and not Roman Catholic, so they dispute Papal Infallibility on stronger theological terms than the rest of the Western bishops; and they also lack a sizable Protestant population and liberal tradition, which the former is Catholicism's most significant religious competitor and the latter is the "error" being addressed by the Council. With this cut, the table now reports a Catholics versus Protestant establishment division, and quadrant 2 is the only one to change, because the three cut countries were non-Catholic confessional states.

Table 3: Episcopal opposition by legitimation regime, states contesting a Reformation rival

Protestant establishment (PRTGRP) \ Catholic government preference (CATGRP)	Strong	Weak
Strong	(1) Positive parity Unweighted 40.0% Weighted 41.1% (Bavaria, Belgium, Canada, France, Switzerland, Württemberg)	(2) Best alternative Unweighted 67.8% Weighted 66.7% (Germany, UK) [Greece, Persia, Turkey: excluded]
Weak	(3) Confessional Unweighted 11.4% Weighted 13.7% (Argentina, Austria−Hungary, Brazil, Chile, Italy, Papal States, Portugal, Spain, Uruguay)	(4) Detached Unweighted 15.0% Weighted 43.8% (Mexico, Netherlands, USA, Venezuela)

Note: restricted to states whose GRP preferred religion is Catholic or Protestant (prfid 1100, 1200, 1400, 1510), so the comparison is Catholicism against a Reformation rival. Greece, Persia and the Ottoman Empire leave; within this subsample the Protestant and any−tradition axes coincide exactly. Strong is an index value above 2, weak is 2 or below.

Notes: As Table 2, restricted to states whose GRP-preferred religion is Catholic or Protestant (`prfid` 1100, 1200, 1400, 1510), so that the alternative supplier is a Reformation rival competing for the same establishment privileges. Greece, Persia and the Ottoman Empire leave the sample; each records Catholic government preference at or below neutrality, and therefore purchased no Catholic legitimation for the Council's decrees to reprice. Within this subsample the Protestant and any-tradition axes coincide exactly, so quadrants (1), (3) and (4) are unchanged and only quadrant (2) is affected.

The observed ordering is 2) 66.7% > (4) 43.8% > (1) 24.2% > (3) 13.7%. The observed orderings' extremes match the model's prediction, and the parity cells fall between them. One trouble with the data

currently is qualifying quadrant 4. Negative parity suggests that the country does not rely on any religious legitimation to produce its legitimacy. The inclusion of the United States gives confidence to these groupings, as disestablishment is codified in the Constitution. However, there is a high opposition from the United States, which the model would predict would give relatively low opposition.

To give a better idea of where the countries in my sample fall on the share of catholic legitimation, I compute the Catholic share of religious legitimation and plot it against the state's mean bishop opposition rate in Figure 2.

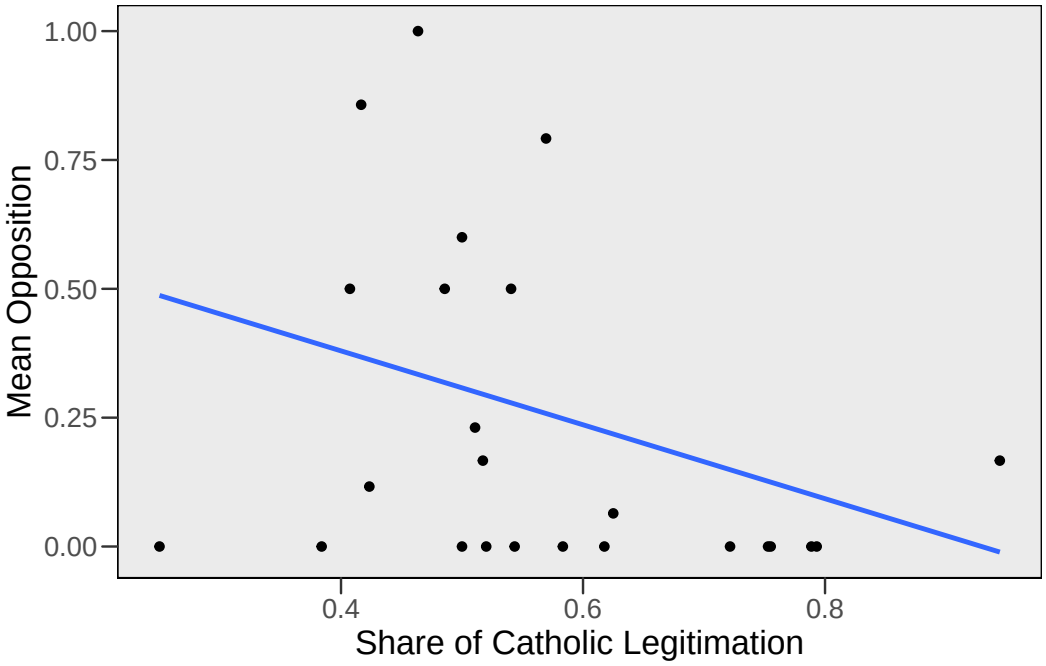

Figure 2: Catholic share of religious legitimation and Average Bishop opposition

Notes: The horizontal axis is $\hat{s}_R$ = CATGRP/(CATGRP + Alt. best), the estimated Catholic share of the state's religious legitimation. The vertical axis is the share of a state's council fathers recorded in opposition. The solid line is a linear fit weighted by delegation size. States with equal Catholic and alternative preference scores return $\hat{s}_R = 0.5$ by construction and are not distinguished by this measure, so positive and negative parity states return roughly the same $\hat{s}_R$ measure at around 0.5.

The model predicts a negative relationship. A bishop expects a loss of rents when own-price elasticity of catholic legitimation is elastic:

$$|\eta_{RR}| = \sigma(1 - s_R) > 1 \tag{12}$$

Equation 12 is decreasing in the Catholic share. A state that already directs most of its legitimation budget to the Catholic hierarchy has a rival input too small to absorb much reallocation, so the quantity purchased moves little however substitutable the two suppliers are. Bishops in such states expect to retain

their rents; bishops in states with a large alternative do not. Table 4 gives the dataset on the two favoritism measures and the breakdown by country and within their respective quadrant blocks.

Figure 4 gives $\hat{s}_R$ to proxy the share of Catholic legitimation. I am assuming that total cost rises and falls with the index value to justify this approximation. There are some interesting outlier cases to investigate. Austria-Hungary is a confessional state but has an higher average opposition at 0.792. However, among the confessional states, it has the lowest $\hat{s}_R$ at 0.569, which rivals some of the estimations in quadrants 1 and 4. The United States stands out in quadrant (4) as the only country with any opposition, and it has the largest delegation of bishops at the council. The Ottoman empire sticks out with its large bishop delegation of 43 for a Catholic population share of 2.3%.

Investigating these cases further could be useful in a future draft of this paper. My initial reaction to these cases is that they seem to be outlier cases and not representative of the overall trend. Josephinism is a theological belief originating in Austria-Hungary that believes that the state should have larger control over bishop appointments than the Pope. Although by the 1870s, this belief was not popular. Among secular and liberal politicians, this belief was held in a renewed form. Additionally, a week after Vatican I, Austria-Hungary revoked the concordat of 1855 on the basis that the terms of agreement were changed and the other contracting party, the Church, was entirely different (Weinzierl-Fischer 1960; Evans 1999). Pius IX responded with encyclical *Vix dum a Nobis* to convince Austria-Hungary to restore the revoked concordat.

The US has disestablishment of religion held in its constitution, and the GRP data has each religion at the same score, suggesting complete neutrality towards all potential religious sources. Although, the Catholic population in the US is surprisingly quickly as many Catholic immigrants enter the country, and the source of bishop opposition might be more motivated from a hostile nativist and Protestant reaction to uniquely Catholic beliefs, in which the papacy is a particularly hard doctrine for Catholics and Protestants to reconcile.

The Ottoman Empire controls a large territory over most of North Africa, the Balkans, the Middle East, and Turkey. Moreover, Catholics in these regions are Eastern rite and not Roman Catholic. During the council, Pope Pius IX summoned and tried to limit the autonomy of the Eastern Patriarchs, causing a lot of disagreement and consternation between the two. Additionally, the Eastern rite does not agree with papal supremacy as wholesale as the Roman Catholic rite, so there is an additional doctrinal and canonical difference between Eastern Rite and Roman Catholic, which might be influencing the opposition decisions of the Ottoman bishops (who are mostly Patriarchs).

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Table 4: State classification and variable values, 1870

Quadrant	State	# Bishops	CATGRP	Alt. best	Alt. religion	$\hat{s}_R$	σ^*	Mean opp.	% Cath.
(1) Positive parity									
	Bavaria	6	2.500	2.125	Protestant	0.541	2.18	0.500	71.3
	Belgium	6	2.500	2.100	Western Christian	0.543	2.19	0.000	98.0
	Canada	13	2.567	2.458	Western Christian	0.511	2.04	0.231	40.2
	France	58	2.125	2.250	Western Christian	0.486	1.94	0.500	95.8
	Switzerland	6	2.500	2.333	Western Christian	0.517	2.07	0.167	40.6
	Württemberg	1	2.550	2.950	Western Christian	0.464	1.86	1.000	30.4
	Weighted mean		2.269	2.275		0.499	2.00	**0.411**	81.9
	Unweighted mean		2.457	2.369		0.510	2.04	0.400	62.7
	States / bishops	6 states, 90 bishops							
(2) Best alternative									
	Germany (Prussia)	7	2.000	2.800	Western Christian	0.417	1.71	0.857	32.7
	Greece	3	2.000	3.208	Orthodox	0.384	1.62	0.000	0.9
	Ottoman Empire	43	1.958	2.667	Muslim	0.423	1.73	0.116	2.3
	Persia	1	1.000	3.000	Muslim	0.250	1.33	0.000	0.3
	United Kingdom	8	1.700	2.473	Anglican	0.407	1.69	0.500	16.7
	Weighted mean		1.916	2.688		0.416	1.71	**0.242**	7.5
	Unweighted mean		1.732	2.830		0.376	1.60	0.295	10.6
	States / bishops	5 states, 62 bishops							
(3) Confessional Catholic									
	Argentina	4	2.850	1.100	Western Christian	0.722	3.59	0.000	85.6
	Austria-Hungary	24	2.562	1.938	Western Christian	0.569	2.32	0.792	76.1
	Brazil	3	2.625	1.625	Western Christian	0.618	2.62	0.000	93.6
	Chile	2	3.067	0.800	Western Christian	0.793	4.83	0.000	95.6
	Italy	140	2.292	1.375	Western Christian	0.625	2.67	0.064	99.7
	Papal States	36	3.778	0.222	Western Christian	0.944	18.00	0.167	99.6
	Portugal	3	3.083	1.000	Western Christian	0.755	4.08	0.000	99.8
	Spain	35	2.800	0.750	Western Christian	0.789	4.73	0.000	99.3
	Uruguay	1	2.667	0.875	Western Christian	0.753	4.05	0.000	62.0
	Weighted mean		2.636	1.161		0.694	3.27	**0.149**	96.9
	Unweighted mean		2.858	1.076		0.730	3.70	0.225	90.1
	States / bishops	9 states, 248 bishops							
(4) Negative parity									
	Mexico	9	1.300	1.200	Western Christian	0.520	2.08	0.000	98.2
	Netherlands	2	1.800	1.800	Western Christian	0.500	2.00	0.000	35.6
	United States	35	1.880	1.880	Western Christian	0.500	2.00	0.600	9.2
	Venezuela	2	1.750	1.250	Western Christian	0.583	2.40	0.000	91.1
	Weighted mean		1.762	1.723		0.507	2.03	**0.438**	30.4
	Unweighted mean		1.682	1.532		0.526	2.11	0.150	58.5
	States / bishops	4 states, 48 bishops							

Notes: Government religious preference is measured in 1870. "Alt. best" is the highest preference score among all non-Catholic traditions in GRP 2.0; "Alt. religion" names the tradition supplying it. $\hat{s}_R$ = CATGRP/(CATGRP + Alt. best), and $\sigma^* = 1/(1-\hat{s}_R)$ is the elasticity of substitution at which the bishop is indifferent to the price increase: he gains if $\sigma < \sigma^*$ and loses if $\sigma > \sigma^*$. Cell values of σ^* are computed from the cell mean of $\hat{s}_R$ rather than averaged across states, since $1/(1-\hat{s}_R)$ is convex. Cells split each index at 2.0, the value the GRP codebook designates as state neutrality. Weighted means use council fathers with a recorded vote. States sending only vicars apostolic (China, Japan, Siam) and states without GRP coverage are excluded.

6 Conclusion

This paper presented both historical and empirical evidence to test a rational choice explanation for bishop opposition during Vatican I. The historical context of Vatican I shows that the papacy's secular influence was coming to an end, against the wishes of Pope Pius IX. Vatican I proved to be a conservative council that insulated itself from the political realm by limiting the autonomy of the dioceses across the world. The cross-sectional analysis performed does not provide adequate evidence to draw any causal connections, but the statistical correlation and relationships within the data suggest that a model of church and state cooperation provides valid explanations for political and religious leaders' behavior. Bishops in countries with non-Catholic establishment and more mixed employment of Protestantism and Catholicism were more likely to be in the opposition, which is what is implied by framing these inputs as substitutes. This paper presents a method for analyzing the relative importance of the type of ideology that a government adopts to provide for its legitimacy. Avenues for further research is to use more robust data and methods to tease out causal relationships.

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Appendix

8 Derivation of the Equation 5: Own-Price Elasticity

Assumptions. **(A1)** $L = f(R, A)$ is twice continuously differentiable, strictly increasing ($L_R, L_A > 0$), and strictly quasiconcave, so isoquants are convex and the first-order conditions are sufficient. **(A2)** $P_R, P_A > 0$.

Definitions. The program is $\min_{R,A} \; P_R R + P_A A$ subject to $f(R, A) = \bar{L}$, with solutions $R^*(P_C, P_A, \bar{L})$ and $A^*(P_C, P_A, \bar{L})$ the *conditional* input demands, and $E = P_R R^* + P_A A^*$ the cost function. Shares are $s_R = \frac{P_R R^*}{E}$ and $s_A = \frac{P_A A^*}{E}$, so $s_C + s_A = 1$ identically. σ is as in $\frac{dln(A/R)}{dln(P_R/P_A)}$ and $\eta_{ij} = \partial \ln R_i^* / \partial \ln \pi_j$ at fixed $\bar{L}$. Throughout, P_A and $\bar{L}$ are held fixed.

Step 1. Form the Lagrangian $\mathcal{L} = P_R R + P_A A - \lambda \left[f(R, A) - \bar{L} \right]$.

Step 2. First-order conditions give $P_R = \lambda L_R$ and $P_A = \lambda L_A$, with $\lambda = P_R / G_C > 0$ by (A1)–(A2).

Step 3. Dividing eliminates λ: $P_R / P_A = L_R / L_A = \text{MRTS}$. This is why σ may be written in prices rather than marginal products.

Step 4. Because $\bar{L}$ is fixed by construction, the constraint holds as an identity in P_R: $f[\![R^*(P_R, \cdot), A^*(P_R, \cdot)] \equiv \bar{L}$.

Step 5. Differentiating that identity, $L_C \frac{\partial R^*}{\partial P_R} + L_A \frac{\partial A^*}{\partial P_R} = 0$: whatever readjustment the price change induces leaves the state on the same isoquant.

Step 6. Substituting the first-order conditions and multiplying by λ,

$$P_R \frac{\partial R^*}{\partial P_R} + P_A \frac{\partial A^*}{\partial P_R} = 0.$$

This converts a statement about unobservable technology into one about prices and quantities.

Step 7. Multiplying by P_R / E and expanding each term by its own input yields the share-weighted adding-up condition

$$s_C \, \eta_{RR} + s_A \, \eta_{AC} = 0. \tag{13}$$

Step 8. Since P_A is fixed, $\partial ln P_A = 0$, and $\sigma = \frac{dln(A/R)}{dln(P_R/P_A)}$ may be written as a difference of elasticities:

$$\sigma = \eta_{AC} - \eta_{RR}. \tag{14}$$

Step 9. Equations (13) and (14) are two linear equations in η_{RR} and η_{AC}. Substituting $\eta_{AC} = \eta_{RR} + \sigma$ into (13),

$$s_C\eta_{RR} + s_A(\eta_{RR} + \sigma) = 0 \implies \underbrace{(s_C + s_A)}_{=1}\eta_{RR} = -s_A\sigma \implies \eta_{RR} = -\sigma(1 - s_C).$$

Data Information

The GRP dataset creates a composite index measure from five main areas of government favoritism:

1. Official Status: Is there a state religion? Is there special recognition or protection? Is there explicit separation of Church and State?
2. Religious Education: Is religious education required? Can students opt out of religious education?
3. Financial Support: Is there financial support for a religion through subsidies or tax breaks? Are all religions supported equitably or is one favored?
4. Regulatory Burden: Do all religions have the same regulatory burden? Or do some religions have harsher or lighter burdens?
5. Freedom to Exercise: Is a religious practice required? Or are there restrictions to public and private worship of a religions

Each of these five categories receive a score ranging from 0 (most unfavorable) to 4 (most favorable). It is important to note that a score of 2 represents government neutrality, where the state neither supports nor prosecutes a religion. These five categories are averaged into a composite index measuring the overall government favoritism from a state. If any category is missing data, then the composite index is still the average of the categories that have data, resulting in some cases a larger weight being placed on certain aspects of government favoritism. I use the GRP index to proxy a state's employment of a religion. A higher score indicates greater amount of government resources allocated to a religion. With GRP index, I can proxy the quantity demanded by the state from every possible religious source of legitimacy.

The raw combined dataset is a cross-section of bishops as the observational unit. I have roughly 500 observations of individual bishops and their voting decisions. The bishop voting data is measured at the diocese level, and there are multiple dioceses in most countries. The GRP and RCS give observations at the national level. To fit the outcome of bishop opposition to the variability of the covariates, I aggregate bishop opposition for each country, so it represents the average opposition of bishops from that country. For

example, if a country has ten bishops represented at Vatican I, and five of them vote for propositions that are in the opposition party, then that country's opposition value becomes 50%.

After aggregating the dependent variable, I have a dataset with 33 observations at the country-level. I considered any proposition that supported bringing papal infallibility to a vote or as a topic for further discussion as a majority proposition, and I considered any proposition delaying the vote for papal infallibility or postponing discussion of papal infallibility as a minority proposition.[6] If I could not find any record of a bishop voting for either a minority or majority proposition, then I left that bishop's opposition status empty and removed that observation. It was common for bishops to attend the ceremonial convocation of the council without actually participating in the preceding congregations and discussions. The count and record for bishops who attended Vatican I was taken at the initial ceremonial opening. It is also likely that several bishops did not spend the entire length of the council in attendance at Rome. A bishop might return to his diocese to resolve any pressing matters; for example, many French and German bishops started to return to their dioceses before the end of the council due to the developing Franco-Prussian war.

8.1 Majority and Minority Propositions

Speech given before a resolution for papal infallibility (I provide both the original latin and translated text):

"non-definitionistis, ut aiunt, laudes deeernant uberrimas. Signum dederunt nonnullis universitatum professoribus, ut eosdem hymnos et easdem irrisiones repetant. Muliercularum etiain garrulitatem in suum advocaverunt auxilium , ut struatur obex, et fiumeu Dei non transeat. Tandem, et id prae omnibus lugendum est, guberniorum civilium interventionem suscitare tentaveiunt, us quod virtute ratiocinii fokan impediri non posset, efficacius minis et timore malorum temporalium praepediretur. In hoc et tot scandalorum et tot angustiarum concursu, impossibile est evidenter cuilibet episcopo, ex intimis praecordiis sanctam sedem, ecclesiam et animas diligenti, ardentissime non optare, ut infallibilitas tam graviter offensa, gloriose et absque mora, definitione non vindicetur" (Mansi 1926, Pg 704).

"non-definitionists, as they say, deserve the most abundant praise. They have given a signal to some university professors to repeat the same hymns and the same mockery. They have also called on the chatter of women to their aid, so that a barrier is erected and the river of God does not pass. Finally, and that it is to be regretted by all, that they tried to raise the intervention of civil governments, so that what could not be prevented by the power of reasoning, might be prevented more effectually by threats and the fear of temporal evils. and the diligent souls do not wish most ardently, that the infallibility so grievously offended, may not be gloriously and without delay, by definition vindicated." (Mansi 1926, Pg 704).

[6]The appendix provides textual examples of what I considered to be both a majority and minority propositions.

Speech given before a resolution against papal infallibility:

"Cum enim inter potiores nationes catholicas munere episeopali fungamur, rerum apud eas statum quotidiano noscimus usu, atque ideo nobis reapse constat definitionem huiusmodi, quae nulla cogente necessitate postulatur, nova inimicis in ecclesiam arma suppeditaturam, atque apud plurimos etiam melioris notae viros fore minus acceptam, ita ut illi ansam assumerent reliqua catholicae ecclesiae iura invadendi; hi vero (quod animo nobis coram Deo et hominibus aite infixum tibi, pater optime, adaperire statuimus) non absque periculo schismatis, in praecipuis religionis nostrae sanctissimae officiis persolvendis ac bonis operibus adimplendis j elaxarentur.

Haec sanctitati tuae, ea quam supremo omnium fidelium patri debemus sinceritate, exposuimus, et tuo, precamur, mandato fiat, ut doctrina, cuius sanctionem petunt, eoncilio oecumenico discutienda haud proponatur" (Mansi 1926, p. 685–686).

"For since we exercise the episcopal office among the most important Catholic nations, we know the state of affairs among them by daily experience, and therefore it is truly clear to us that a definition of this kind, which is not demanded by any compelling necessity, will supply new weapons to the enemies of the Church, and will be less acceptable to many men of even better reputation, so that they will take up the task of invading the remaining rights of the Catholic Church; while these (which we have determined to reveal to you, most excellent father, before God and men) will not be free from the danger of schism in the discharge of the principal duties of our most holy religion and in the accomplishment of good works.

We have explained this to your holiness, with the sincerity which we owe to the supreme father of all the faithful, and we pray that it be done at your command, so that the doctrine whose sanction they seek will not be proposed for discussion in the ecumenical council." (Mansi 1926, pp. 685–686).

Additional Descriptive Statistics

Below is the list of countries represented at the First Vatican Council with their respective representation:

Regression Results

Below are the results of the regressions for the figures in section 5. There are two regression tables. The first shows the substitutability of Catholic government preference (CATGRP) with the best alternative government preference (ALTGRP). The second shows the mean opposition on these government preference measures.

Table 5: Country and Bishop Representation

Country	Bishops	Country	Bishops
Argentina	4	Mexico	9
Austria-Hungary	24	Netherlands	2
Bavaria	6	Ottoman Empire	43
Belgium	6	Papal States	36
Brazil	3	Portugal	3
Canada	13	Spain	35
Chile	2	Switzerland	6
France	58	United Kingdom	8
Germany	7	United States	35
Greece	3	Uruguay	1
Persia	1	Venezuela	2
Italy	140	Württemberg	1

24 states, 448 bishops

Country	Opposition	Catholic Preference	% Catholic	Protestant Preference	% Protestant	Atheist Tolerance
Argentina	0	2.850	85.600	1.100	0.318	1
Austria-Hungary	0.792	2.560	76.100	1.940	9.010	1.040
Bavaria	0.500	2.500	71.300	2.120	27.600	1.070
Belgium	0	2.500	98.000	2.100	0.105	1.200
Brazil	0	2.620	93.600	1.620	0.587	1.620
Canada	0.231	2.570	40.200	2.460	43.200	1.330
Chile	0	3.070	95.600	0.800	0.379	0.800
China	0	0.917	0.142	1.420	0.010	1.420
France	0.500	2.120	95.800	2.120	4.080	1.500
Germany	0.857	2	32.700	2.800	63.900	1.500
Greece	0	2	0.863	2	0.028	1.120
Iran	0	1	0.290	1	0.018	1.250
Italy	0.064	2.290	99.700	1.380	0.097	1.250
Japan	0	1	0.055	1	0.046	1
Mexico	0	1.300	98.200	1.200	0.034	1.100
Netherlands	0	1.800	35.500	1.800	62.400	1.400
Ottoman Empire	0.116	1.960	2.270	1.960	0.175	0.625
Papal States	0.167	3.780	99.600	0.222	0.028	0
Portugal	0	3.080	99.800	1	0.017	1
Spain	0	2.800	99.300	0.750	0.018	0.750
Switzerland	0.167	2.500	40.600	2.330	58.700	1
Thailand	0	1.330	0.177	1.330	0.046	1.330
United Kingdom	0.500	1.700	16.700	2.130	17.100	1.350
United States	0.600	1.880	9.180	1.880	71.700	1.420
Uruguay	0	2.670	62.000	0.875	0.643	0.750
Venezuela	0	1.750	91.100	1.250	0.110	1
Wuerttenburg	1	2.550	30.400	2.950	68.900	1.100

Table 6: Trimmed Dataset with Variable Values

Table 7: Substitution: opposition and the best non-Catholic alternative

	Dependent variable:			
	Mean episcopal opposition			
	(1)	(2)	(3)	(4)
ALTGRP	-0.420^{***}	-0.522^{***}	-0.288	-0.542^{***}
	(0.131)	(0.109)	(0.205)	(0.148)
Catholic %			0.004	-0.001
			(0.004)	(0.003)
Constant	3.101^{***}	3.233^{***}	2.626^{***}	3.312^{***}
	(0.263)	(0.197)	(0.622)	(0.420)
Bishop-weighted	No	Yes	No	Yes
Bishops represented	–	448	–	448
Observations	24	24	24	24
R^2	0.319	0.508	0.341	0.509

Note: *p<0.1; **p<0.05; ***p<0.01
Weighted models weight each state by its recorded votes at the Council.

Table 8:

	Dependent variable:									
	Mean episcopal opposition				mean_opposition					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
CATGRP	−0.420***	−0.522***	−0.288	−0.542***			0.121	0.154**	0.218**	0.232**
	(0.131)	(0.109)	(0.205)	(0.148)			(0.088)	(0.071)	(0.102)	(0.101)
ALTGRP			0.004	−0.001						
			(0.004)	(0.003)						
Catholic %					0.066	−0.077			0.232	0.149
					(0.122)	(0.106)			(0.137)	(0.138)
Catholic share of legitimation	3.101***	3.233***	2.626***	3.312***	0.117	0.428	0.048	−0.010	−0.671	−0.490
	(0.263)	(0.197)	(0.622)	(0.420)	(0.293)	(0.257)	(0.176)	(0.128)	(0.457)	(0.465)
Bishop-weighted	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Bishops represented	–	460	–	460	–	460	–	460	–	460
Observations	24	24	24	24	24	24	24	24	24	24
R^2	0.319	0.508	0.341	0.509	0.013	0.024	0.080	0.176	0.190	0.219

Note: *p<0.1; **p<0.05; ***p<0.01
Weighted models weight each state by its recorded votes at the Council.