EARMARKED:
THE POLITICAL ECONOMY OF AGRICULTURAL RESEARCH APPROPRIATIONS

Marc T. Law
Department of Economics
University of Vermont
Tel: (802) 656-0240
Fax: (802) 656-8405
E-mail: *Marc.Law@uvm.edu*

Gary J. Miller
Department of Political Science
Washington University
Tel: (314) 935-5874
Fax: (314) 935-5856
E-mail: *gjmiller@artsci.wustl.edu*

Joseph M. Tonon
Department of Political Science
Washington University
Tel: (314) 935-5810
Fax: (314) 935-5856
E-mail: *jmtonon@artsci.wustl.edu*

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Abstract

This paper examines the origin and persistence of agricultural research earmarks. Since 1965, a significant portion of USDA research funds have been directly earmarked by Congress for particular research projects. These so-called "special grants" are a source of political pork for individual legislators. While special grants have become a vehicle for pork-barrel politics, this outcome was the unintended consequence of legislation sought by the USDA to deploy its research funds more efficiently. We illustrate and model the process by which a minority of Congress is able to induce the USDA to carry out its budgetary suggestions and show that the elimination of special grants is unlikely in spite of intense opposition from particular legislators, the White House, and the academy. The story of the special grants program provides an excellent illustration of path-dependence in government policy as well as an example of how distributive politics can arise in a context without voting.

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I. INTRODUCTION

At the National Institutes of Health (NIH), and the National Science Foundation (NSF), decisions about which scientific research projects to fund are largely made by other scientists. Appropriations for research projects at other agencies, especially those at the Defense Department, NASA, and the Department of Agriculture (USDA) are not. For instance, at the USDA, only 8.5 percent of USDA research dollars were allocated to the peer-review competitive process (REE 2004, p. 28). At these agencies, decisions about which research projects to fund are made by members of Congress through a process called "earmarking".[1] The appropriations committees let the USDA know which projects should be funded through a system of "special grants." Since 1965, an increasing amount of federal agricultural research dollars has been spent on special grants. Why has a large and growing percentage of agricultural research come to be insulated from the discipline of peer-review?

There appears to be a widespread consensus that the quality of earmarked research at the USDA is low. Since the Pound Report in 1972 (NRC 1972), earmarked research has been consistently criticized by scientific bodies. The National Academy of Sciences, in reference to congressional earmarks, (NRC 1972, p. 23), noted, "A serious hazard here is decision without adequate information and judgment." The Association of American Universities (AAU), a group of 62 top research institutions, has also tried to use professional pressure to discourage universities from requesting earmarked research dollars (Malakoff 1998, p. 1436). Because earmarks deliver narrow benefits to specific

[1] An earmark refers to funds set aside within an account for a specified purpose. Earmarks are used in annual appropriations acts to direct the availability of funds for specific projects or purposes. See Streeter (1999).

constituents, they are a form of pork-barrel politics. Hence, it is not surprising that no one trusts the current system of earmarking strongly enough to fund it adequately. While other scientific agencies have experienced dramatic increases in their budgets, the USDA has not. Between 1983 and 2003 real federal spending on the NIH and the NSF grew at an average annual rate of 5.37 percent and 2.43 percent, respectively, while the USDA's research budget only increased at a rate of 0.7 percent per year during this same period (REE 2004, p. 52). Nevertheless, the politics of earmarking is entrenched.

Because research is a public good, economists generally argue that there is a role for government in supporting research. However, from an efficiency perspective, Congressional earmarking of agricultural research may not be an optimal mechanism for allocating government research dollars. This is for two reasons. First, Congress does not have a comparative advantage in evaluating the quality of science. An advantage of peer-review mechanisms is that qualified scientists possess the expertise that Congress does not.[2] Second, individual members of Congress may lack the incentive to adequately fund and pursue good science. While society as a whole may prefer research that generates broad and diffuse benefits, members of Congress have an incentive to fund research projects that generates narrow and specific benefits to their constituents. It would appear that there is a fundamental conflict between the type of science that is good for society and the type of science that is good for Congressional re-election (NRC 1972, 1989, 2000, 2002, 2003). This particular tension does not characterize the peer-review process.

[2] While Congressional committees may be organized to reduce the asymmetric information problem, (Weingast and Marshall 1988; Gilligan and Krehbiel 1990) scientists still have a comparative advantage over committee members in evaluating the quality of research proposals.

In this paper we take as given the efficiency problems with research allocations undertaken by a small number of legislators without benefit of advice by scientists.[3] The purpose of our paper is to elucidate the origins and persistence of agricultural research earmarks. Our approach is that of an institutional, historical case study. We argue that while special grants for agricultural research have become an important source of political pork for certain legislators, specifically, members of the House and Senate Agricultural Appropriation Subcommittees, this outcome was the unintended consequence of legislation sought by the USDA to utilize its research funds more efficiently. We illustrate and model how a minority of Congress (*i.e.* members of the House and Senate Agricultural Appropriations Subcommittees) induces the USDA to carry out its preferred research earmarks, and show that because of the structure of the budget process, the elimination of these grants is unlikely even in the face of intense opposition from certain legislators, the academy, and the President. We argue that the story of the special grants program provides a good illustration of path-dependence in the political process because in the absence of the legislation that created this program, it is unlikely that agricultural research would have become so highly politicized.[4]

This study is significant not only because it explains why earmarked agricultural research became important to Congress, but also because it furnishes a fascinating example of how distributive politics can arise without voting. Distributive and pork-barrel politics are synonymous because benefits are narrowly defined and costs are

[3] There is a widespread belief among scientists that peer-review is a superior mechanism for allocating research funds. Additionally, in the context of agricultural research, there is substantial anecdotal evidence that earmarked research is of lower quality and questionable scientific merit. See NRC (1972, 1989, 2000, 2002, 2003).

[4] The US sugar program (Krueger 1990) and the federal ethanol subsidy (Johnson and Libecap 2001) also illustrate path-dependence in government policy.

broadly dispersed. Hence, in most accounts of distributive politics, there is no majority rule winner. Therefore, if a winning coalition is to be formed, it is necessary for individual members of Congress to engage in a quid pro quo. In other words, a log-roll must be forged if programs that only benefit a minority are to be enacted by a majority (Mueller 2003; Ferejohn 1974; Johnson and Libecap 2003). While this is usually the appropriate model for understanding pork-barrel politics, it is simply not applicable in the context of agricultural research earmarks. Because of the institutions that govern the budgetary process, Congress as a whole never votes on agricultural research earmarks. Hence, no majority log-roll is necessary to support the outcome. As we will show, it is the nature of the budget process, combined with the deference that the implementing agency (the USDA) pays to agricultural appropriations, that allows agricultural research earmarks to persist.

This paper is structured as follows. Section II describes the development of the 1965 legislation (PL 89-106) that created the special grants program that forms the institutional foundation for earmarking agricultural research. Section III outlines the nature of the budgetary process, and presents a simple model that explains how agricultural research earmarks are supported. Section IV presents some empirical evidence that supports our claims. Section V details the emergence of opposition to this program from the White House, other actors in Congress, and the scientific community, and explains why special grants are unlikely to be eliminated. Section VI examines whether the legislative equilibrium that resulted from PL 89-106 is path-dependent. It also addresses the important question of why earmarked research is not more common. Section VII concludes.

II. HISTORICAL BACKGROUND

Prior to 1965, federal support to agricultural research largely took the form of block grants to the land grant universities and colleges (Hatch Act of 1887 as amended in 1955), narrowly defined contracts for specific research outputs (Agricultural Research and Marketing Act of 1948), and grants to non-profit organizations for basic research (Public Law 85-934 of 1958). In the early 1960s the House, at the request of the USDA, began hearings on new legislation to expand the authority of the USDA to make grants for agricultural research. Under Section 2 of H.R. 7155, the Secretary of Agriculture was authorized "to make grants, for periods not to exceed five years' duration, to State agricultural experiment stations, colleges, universities, and other research institutions and organizations and to Federal and private organizations and individuals for research to further the programs of the Department of Agriculture."

H.R. 7155 augmented the USDA's existing authority to make grants in two fundamental ways. First, it expanded the pool of potential grant recipients. Under PL 85-934, only non-profit organizations could receive USDA research grants. Second, an examination of the USDA's testimony (U.S. House 1963) to the House on H.R. 7155 indicates that this new law was also intended to broaden the scope of potential research projects that could be funded by the USDA. In his testimony to the House Subcommittee, Dr. George W. Irving Jr. of the USDA's Agricultural Research Service, stated:

> [T]his legislation would broaden [our] authority… to do research by grants other than basic research… The reason for this is that we now have no authority to make grants for research in the applied research field.
>
> We believe that this authority is definitely needed in the Department of Agriculture to avail ourselves of a pool of research talent that exists in

> profitmaking [*sic*] organizations. We believe that it is desirable to have it, so we can tap the capabilities, imagination, resourcefulness of individuals in such organizations who can contribute to the agricultural research program (U. S. House 1963, p. 18).

The initial reaction of the subcommittee to this expansion of USDA grant authority was that it was unnecessary. In fact, the USDA, in its testimony, had to convince skeptical House members of the need for this additional authority. In response to Dr. Irving's testimony, an incredulous Mr. Harvey of Indiana asked: "I hope you will pardon me if I seem to be puzzled, but what I am getting at is, Are you not getting along pretty well right now?" (p. 20). In response, Dr. Irving replied: "We are getting along very well right now. I think that the difference here is that we would be given even greater flexibility in the deployment of our research funds with the authority here requested." (p. 20).

Irving's major concern was that the USDA was too constrained by contract authority. "The scientists in the universities, in the research institutions in the country, are unwilling in many instances to be tied down by a plan of work as specific as we need to write it into a contract… The requirements there… are that you cannot have a contract unless, you know when it starts and when it is finished." (p. 21-22) Mr. Harvey went on to ask if the USDA desired this law to expand the amount appropriated for research, or to make the current funding more flexible. Dr. Irving replied by assuring Mr. Harvey that the USDA was merely seeking to utilize existing research funds more efficiently.

H.R. 1755 was enacted as Public Law 89-106 and published in US Statutes at Large on August 4th, 1965 (see Appendix 1). No roll call vote was taken. An examination of the *Congressional Record* suggests that this legislation was uncontroversial. Hence, it would appear that the USDA was able to convince the skeptics on Capitol Hill of the need for this expanded authority.

With the passage of the law, it became necessary for the Secretary of Agriculture to develop rules regarding the administration of these research grants. While Congress has amended PL 89-106 since 1965, the original version of this law is what allows appropriators to fund special grants. The USDA's current interpretation of PL 89-106 can be found in 7 U.S.C.S. § 450i (2004).

Although PL 89-106 was enacted in August 1965, there is no mention of the grant-making authority created by this legislation until the 1969 Agriculture and Related Agencies Appropriations Bill. Curiously, only the Senate appropriators invoked the authority granted under PL 89-106; the House appropriators made no mention of it (U.S. House 1968a), nor is it referenced in the conference report (U.S. House 1968b). In what may be considered the earliest "special grants" made under this authority, Congressional appropriators from the Senate earmarked $1,000,000 for cotton research and $400,000 for soybean research (U.S. Senate 1968).

The implementation of the special grants program did not increase the USDA's flexibility, as the agency had hoped it would. As we will show, while the nominal discretion of the Department was increased by special grants, the actual disposition of that discretionary authority came to rest with the appropriations subcommittees of the House and Senate.

Do special interest hypotheses explain the origins of special grant authority?

Among economists and political scientists, it is often argued that particular government policies arise in response to rent-seeking by special interests. In the most general formulation of this perspective, politicians supply policy to increase their

probability of re-election while interest groups demand policy for private benefits. Some models emphasize the role of interest groups in demanding policy for private advantage (Stigler 1971) while others emphasize the incentives faced by legislators to supply policy for political gains (Weingast, Shepsle, and Johnsen 1981). Clearly, special grants generate benefits for certain legislators (who can claim credit for bringing home the bacon) and constituents (who seek funds for research). But do these models explain the origins of special grants authority at the USDA?

We believe that the evidence does not support this kind of explanation. This is for three reasons. First, our examination of the testimony leading up to the passage of the 1965 law revealed that it was the USDA, not Congress, who sought this grant-making authority (U.S. House 1963). In fact, it is worth recalling that Congress was skeptical of the need for this additional legislation. Second, a close reading of PL 89-106 (see Appendix 1) reveals that the grant making authority resides with the Secretary of Agriculture, not with Congress. As we will discuss shortly, it is through a peculiar interpretation of this law combined with its ability to punish the USDA for failing to carry out earmarks that Congress has managed to use special grants for its own purposes. Third, while special grant making authority was enacted in August of 1965, special grants do not appear until the budget for FY 1969. If Congress *intended* to introduce special grants in order to deliver political benefits, or if special interests from the academy *(i.e.* agricultural scientists) lobbied for this legislation to increase their rents, then we should have observed the use of special grants immediately, since elections were held in both 1966 and 1968. Why would legislators seeking to use this authority to maximize their chances of re-election forgo the opportunity to bring benefits to their districts? Given this

evidence, it would appear that the pork-barrel consequences of the 1965 special grants legislation were unintended by Congress.

The growth of special grants

From these humble beginnings, special grants have become an increasingly important component of USDA agricultural research funds. As illustrated in Table 1, between 1970 and 1975 special grants increased from approximately $4 million to $19 million in constant dollars. By 1990, over $38 million was spent on special grants. In 2002, special grants amounted to nearly $33 million. As a share of USDA support for extramural agricultural research, special grants increased from 2 percent in 1970, to 10 percent in 1975, and 15 percent in 2004. While this may not seem like an alarming trend, when one looks at the amount of money that is granted by the USDA through competitive peer-review, these numbers are striking. The growth in competitive peer-review grants is closely mirrored by the growth in special interest grants. As a share of federal agricultural research spending by the USDA, competitive grants increased from 5 percent in 1980 to 18 percent in 2002. These figures should be contrasted with the other major federal science agencies, namely the NSF and the NIH, where only 1 percent and 6.8 percent, respectively, of these agencies' budgets were earmarked in 2002 (NRC 2003, p. 71). Hence, while science in general has embraced competitive peer-review as the preferred mechanism for allocating research funds, it would appear that the USDA has embraced peer-review and special interest grants to roughly the same degree. What is the process that allows this to happen?

III. THE PROCESS OF EARMARKING

In order to analyze how earmarks are supported it is necessary to understand the budgetary process and the relevant Congressional committees. With respect to the budget process, there are two important types of committees: authorizing committees and appropriation committees. Authorizing committees structure and provide the legal authority for federal agencies. Authorizers make recommendations regarding how much is to be spent by agencies to advance specific objectives. In contrast, appropriation committees determine actual funding levels. Technically, no federal money can be spent by Congress without authorizing legislation. Additionally, agencies cannot spend money for any purpose without the approval of appropriators.

While there are multiple authorizing committees within both chambers of Congress, each chamber only has one Appropriations Committee. Decisions about funding levels for particular programs are delegated to House and Senate Appropriations Subcommittees. For example, authorization for the USDA comes from both the House and Senate Agriculture Committees. Funding levels for the USDA, on the other hand, are decided by House and Senate Agricultural Appropriations Subcommittees. It is often the case that House and Senate Agriculture Appropriations Subcommittees differ in the funding levels they approve for the USDA. Whenever this happens, these two subcommittees reconcile these differences in a conference committee. The document produced by this committee is called the Conference Report, which details how much the USDA can spend and how it is to be spent.

Within the Conference Report are detailed notes or suggestions about how sums of money appropriated for specific programs are to be allocated. It is here that

agricultural appropriators insert their suggestions for research projects under the authorization of PL 89-106. While the funding for all of the USDA's programs is voted on in Congress as one of thirteen appropriations bills, the notes contained in the Conference Report are not; that is, they are not part of the Agriculture Appropriations bill. They are simply recommendations that *are not voted on by Congress as a whole, and consequently do not have the force of law*. In spite of the fact that the USDA as well as the broader scientific community has criticized special grants, the USDA faithfully carries them out. The question for us is, why? How did legislation that was proposed by the Department of Agriculture as a means for generating efficiency through greater bureaucratic discretion and flexibility in the allocation of research funds become a vehicle for political pork?

The answer has to do with the Department of Agriculture's deference to appropriators in Congress. One USDA official admitted to the authors that the Department has *never* defied an Appropriations Committee recommendation. The reason is that the Department is simply concerned that a failure to defer to appropriators' wishes will result in retribution in the form of lower Agriculture budgets in future years.[5] The appropriators' political influence is the precise vehicle by which formal bureaucratic discretion is transformed into the means for political pork—without even the sanction of majority rule. The USDA recognizes that a proportion of the proposals recommended by appropriators in the conference reports are academically weak, with little to offer the scientific community or the state of agricultural knowledge. Nevertheless, the USDA

[5] Weingast and Moran (1983, p. 769) argue that congressional committees "possess sufficient rewards and sanctions to create an incentive system for agencies." It would appear that the appropriators' ability to punish the USDA through the budgetary process provides the agency with the necessary incentives to carry out the appropriators' wishes.

inevitably funds them, with the resolve to "work with" the funded researchers to get the most that they can from the proposed research.

As a means of illustrating the intuition behind how appropriators on the House and Senate Subcommittees on Agricultural Appropriations are able to coerce the USDA into delivering earmarks, consider the following stage game.[6] There are two players in this game, the USDA and the appropriators, and each has two pure strategies. Appropriators choose between giving the USDA a large budget (*L*) or a small budget (*S*) (both with earmarks), and the USDA can either carry out the earmarks contained in the budget (*C*) or not (*NC*).[7] Given that there are two strategies and two players, there are four possible pure strategy outcomes: *{(L, C), (L, NC), (S, C), (S, NC)}*. Appropriators have the following preferences over outcomes: *(L, C)* is preferred to *(S, C)*, which is preferred to *(L, NC)* which is indifferent with *(S, NC)*. Appropriators always want narrow benefits delivered to their constituents. The larger the budget, the more benefits (including earmarks) they can deliver. Hence, if the USDA carries out earmarks, the appropriators prefer a large budget to a small budget, but if the USDA does not, it is indifferent between a large or small budget. The USDA, meanwhile, has the following preferences over outcomes from best to worst: *(L, NC), (S, NC), (L, C), (S, C)*. This preference ordering reflects the fact that the USDA prefers a larger budget to a smaller budget, but it also prefers to have discretionary authority over how its funds are to be allocated (Carpenter 2001). For the normal form representation of this game see Table 2.

[6] This model is obviously very stark in that it removes much of the institutional richness of the budget process. Nevertheless, we believe that it is adequate to illustrate the intuition behind how appropriators are able to coerce the USDA into delivering agricultural research earmarks.

[7] Because of the re-election incentive they face, it never makes sense for appropriators not to include earmarks in the budget.

There are two pure strategy Nash equilibria in the stage game: *{(L, NC), (S, NC)}*. Neither of these equilibria are first-best from the perspective of the appropriators. However, because of the repeated nature of the appropriations process, it is possible for the appropriators to use a trigger strategy to support their most preferred outcome *(L, C)*.[8] As long as the USDA's discount rate is sufficiently high, the appropriators can use their ability to threaten to punish the USDA through a small budget to induce the USDA to carry out its earmarks. Hence, an infinitely repeated setting, appropriators can get what they want.[9]

IV. EVIDENCE OF APPROPRIATORS' INFLUENCE

Our theoretical model shows how appropriators, through their ability to punish the USDA, are able to force the agency to comply with their funding suggestions, even though these suggestions do not have the force of law. Because we cannot directly measure the appropriators' ability to punish the USDA, we cannot directly test this model. We can, however, infer from other evidence the influence that appropriators have over the USDA.

Our first piece of evidence concerns the relationship between appropriations subcommittee membership and the value of special grants allocated to various states. If appropriators have an electoral incentive to provide narrow benefits to their districts (Mayhew 1974), and if appropriators are able to induce the USDA to fund their preferred earmarks, then we should observe a correlation between states that have members on the House and Senate Agricultural Appropriations Subcommittees and the value of

[8] For more on the mechanics of the trigger strategy see the notes below Table 2.

earmarked special grants going to those states. Recall that the first two agricultural research earmarks originating from the Senate in FY 1969 were $1 million for cotton research and $400,000 for soybean research. That cotton research should have received one of the earliest special grants is consistent with our conjecture. Cotton is one of the top two commodities produced in the south (Gardner 2002, p. 237). A glance at the membership of the Senate Subcommittee on Agricultural Appropriations in 1968/69 (see Table 3) reveals that seven of the nine members of the Democratic majority on this subcommittee were from southern states, including the subcommittee chairman. Because of the broad geographic base of soybean production across agricultural states, it is also not surprising that soybean research received the other research earmark from FY 1969.

Regression analysis of the relationship between membership in House and Senate agriculture appropriation subcommittees and the value of research earmarks allocated to each state may provide some additional evidence of the influence that appropriators' possess over the allocation of agricultural research earmarks. For fiscal years 1984, 1986, 1990, 1992, 1994, 1996, 1998, 2000 and 2002 we computed the total amount of special agricultural research grants allocated to each state and matched this with information on membership in House and Senate agricultural appropriations subcommittees and House and Senate Agriculture Committees.[10]

To determine the relationship between committee membership and earmark allocations, we regressed the constant dollar (1984=100) value of earmarks allocated to state *i* in fiscal year *t* on a constant term, a binary variable that equals 1 if state *i* has a

[9] There is little or no chance that the USDA will cease to exist. Moreover, there is very little turnover on appropriations subcommittees. Hence, the repeated game framework is the natural model for our purposes.
[10] For more empirical evidence on the relationship between committee membership and budget allocations see, for instance, Ferejohn (1974), Krehbeil (1990), Schick (2000), and Knight (2004).

Senator on the agricultural appropriations subcommittee in year *t*, another binary variable that equals 1 if state *i* has a House member on the agricultural appropriations subcommittee in year *t,* and a third binary variable that equals 1 if state *i* has members from both the House and the Senate on the agricultural appropriations subcommittee in year *t*. We include an analogous set of indicator variables to control for membership in House and Senate (authorizing) Agriculture Committees. Because states represented on the Agriculture Committees are likely to have a greater interest in agricultural research, and hence, may receive more agricultural research dollars, we need to control independently for the influence this may have on the allocation of research earmarks. Descriptive statistics for our regression variables are shown in Table 4.

Table 5 presents the ordinary least squares regression estimates. We show the results obtained when we pool the data over all the fiscal years in our sample and include year fixed effects. Qualitatively similar results were obtained when we estimated the model separately for each fiscal year and when we omit the year fixed effects. Column (1) displays the coefficient estimates when we only control for appropriations subcommittee membership. Column (2) also controls for authorizing committee membership. Consistent with our hypothesis, we find that membership in the House and Senate agricultural appropriations subcommittees has a positive and significant correlation with the value of special research grant allocations to a given state, regardless of whether we control for agricultural authorizing committee membership. The coefficient estimates from column (2) suggest that having a Senator on the agricultural appropriations subcommittee increases the value of research earmarks received by $360,000; that having a House member on the subcommittee increases the value of

research earmarks allocated by $177,000; and that having both a Senator and a House member on this committee increases the value of research earmarks by an additional $497,000. We also find that House Agriculture Committee membership has a positive and significant correlation with the value of research earmarks but Senate Agriculture Committee membership does not. Hence, it "pays to be an appropriator" and to have an appropriator from one's own state on the subcommittee for agricultural appropriations.

More evidence supporting our claim that appropriators have been able to influence the way research grants are made and distributed at the USDA can be found by examining changes in the composition of the USDA's extramural research portfolio. If appropriators are able to influence the USDA for their own political purposes, we should observe a decline in competitive and quasi-competitive (block grant) grant mechanisms. Is this consistent with the historical record?

With the rise of special grants authority, there has in fact been a dramatic decline in the share of USDA agricultural research funds that are distributed via block grants. Since its inception in 1887, the Cooperative State Research, Education, Extension Service (CSREES), the organization within the USDA that is responsible for administering extramural research, has primarily used block grants to fund the land-grant universities and the State Agricultural Experiment Stations (SAES).[11] Under the Hatch Act of 1887 (amended in 1955), a formula was established that tied the amount of grants received by land-grant schools and the SAES in each state to the level of agricultural production. This formula for allocating research monies created a decentralized, pseudo-competitive system since decisions about which project to fund were determined at a local level by

[11] CSREES was formerly known as the Cooperative State Research Service (CSRS).

university administrators and scientists (NRC 1972, p. 25). Congressional and executive influence over the allocation of research funds was limited to the determination of the funding formula, which was fixed over fifty years ago. Under the block grant, individual legislators could not claim credit for bringing money to their districts because the formula is explicitly linked to the value of agricultural production. With block grants, all of the politics therefore occurs among university administrators, scientists, and local stakeholders, leaving the legislators with no involvement and no basis for claiming credit for bringing research dollars to their districts. As shown in Table 1, however, between 1970 and 2002, block grants declined from 87 percent of the USDA's total research budget for CSREES to 52 percent. While a portion of this decline is attributable to the rise of competitive grants, clearly the onset of special grants authority has coincided with the erosion of block grants.

We believe that this is not simply an accident. To understand this, let us consider the incentives faced by an individual appropriator. As explained earlier, under block grants, individual appropriators cannot claim any credit for agricultural research funds brought to their district since funds are pre-determined by a set formula. By virtue of this funding mechanism, block grants cannot be a source of political pork for federal appropriators. Conversely, when grants can be specifically targeted to particular research projects, appropriators have an incentive to procure special grants for their districts because they can claim credit for making this money available for a local research project (Mayhew 1974, pp. 52-53). Oftentimes these research projects are very narrow in focus,

that is, they generate little or no regional or national public goods.[12] Additionally, because these projects are not peer-reviewed, they are not subject to the same standards as other research funds. This creates a collective action problem for Congress as a whole, since the costs of these projects are spread across the nation, but the benefits are almost entirely local. Every appropriator, regardless of his political persuasion, thus faces a powerful incentive to engage in such behavior to maximize his chances of reelection. Hence, it is perhaps not surprising that the demise of block grants has coincided with the onset of special grants authority.

IV. OPPOSITION TO EARMARKING

Earmarked special research grants have clearly come to play an important role in the USDA's research budget. While earmarking has been a political boon to certain legislators and certain scientists, since 1972 the scientific priorities established by earmarked research funds have been called into question by a number of groups. In fact, for the last 30 years, the entire process of earmarking has come increasingly under attack by some scientists, universities, certain legislators, and the executive branch. In this section we will detail the growth of opposition to earmarked research at the USDA.

Opposition from the scientific community

Let us begin with the scientific establishment. Since the early 1970s professional scientists in the academy as well as within the USDA and other federal research agencies

[12] Consider, for instance, the following special grants authorized under PL 89-106 for the 2002 fiscal year (U.S. House 2001): $260,000 for asparagus technology and production in WA; $172,000 for cranberry/blueberry research in MA; $294,000 for wool research in TX, MT, and WY.

have expressed growing concerns about the quality of science being funded by the USDA. One of the most prominent and important critiques of USDA science was published in 1972 by the National Research Council of the National Academy of Science. Entitled the *Report of the Committee on Research Advisory to the US Department of Agriculture* (the so-called Pound Report), the authors of this study argue that the central problem with earmarked research is that it may lead to "decision without adequate information and judgment." (NRC 1972, p. 23) With earmarking has come a gradual erosion in the influence of scientific experts over the allocation of research funds. Instead, politicized interests take priority over sound scientific judgment and politically important commodities (cotton, for instance) receive a disproportionate share of earmarked funds. This concern is patently evident in the following quotation from the Pound Report (NRC 1972, p. 21):

> The Congress may not wish to appropriate money for research in general but rather for research on particular problems. In the faith that science can solve these problems, a legislature may decide to attack a clearly perceived problem in agriculture by allocating funds specifically to that problem. Although the faith in a solution may be encouraged by particular scientists, the principal force brought upon the legislature is generally without much regard for the researchability [*sic*] of the problem. The legislature then too often "earmarks" money on the basis of needs rather than feasibility.

Hence, as one if its recommendations, the Pound Report urged Congress and the USDA to "seek a greatly increased level of appropriations for a competitive grants program, which should include support of basic research in the sciences… that underpin the USDA mission… The Committee recommends that this program be administered in such a way that research proposals are subject to evaluation by peer panels of selected scientists…" (p. 49).

While many might believe that the Pound Report is anomalous, this is not at all the case. Since the Pound Report, there have been four additional National Research Council evaluations of the quality of science at the USDA (NRC 1989, 2000, 2002, 2003). While some of these studies were initiated by the National Academy of Science itself, most were undertaken at the request of either Congress or the USDA. In each of these studies, the National Research Council has reiterated the need for more peer review evaluation of agricultural research proposals.

The National Academy is not alone in criticizing the USDA research enterprise. In fact, numerous independent groups have admonished the USDA and its Congressional supporters for relying on outmoded and non-peer reviewed mechanisms for distributing research funds. For instance, the *Report of the Research, Education and Economics Task Force of the United States Department of Agriculture* (otherwise known as the Danforth Report of 2004), as well as *Science for Agriculture: Report of a Workshop on Critical Issues in American Agricultural Research* (the so-called Rockefeller Report of 1982) both urge the USDA to firmly embrace peer-reviewed science (REE 2004; Rockefeller Foundation 1982). Individual scientists have also been critical of how USDA research funds are allocated. For example, in an article published in *Science*, Krogmann and Key (1981) discuss the need for more peer-reviewed science at the USDA. These authors go on to argue that peer-reviewed science has not been fully adopted at the USDA for political, institutional, and administrative reasons. Indeed, scientists critical of earmarking have noted the poor incentives it creates for both politicians *and* researchers. For instance, in a letter published in *Science* in November 11th, 1988, Charles E. Hess

(1988, p. 242), Dean of the College of Agricultural and Environmental Sciences at the University of California, Davis, wrote:

> Widespread circumvention of the merit review process is eroding the foundation of our system for federally supported research. This system depends on a delicate balance between federal funding of research and federal control of research. Further, it entrusts the scientific community with determining the nature of our research and with ensuring its quality. Pork barreling by the scientific community compromises our objectivity and integrity. Consequently, we stand to forfeit our right to play a significant role in federal resource decision making.

Hence, it is clear that the scientific research establishment has come to hold a very low opinion of earmarked agricultural research.

Opposition within Congress

Within Congress many members are willing to engage in pork-barrel politics while others are not. Restraint in public budgeting is clearly a public good. When one legislator shows restraint in the allocation process, he affords an opportunity for another member to bring more bacon home to his district. Spendthrift legislators therefore have an incentive to free ride off the restraint exercised by their more thrifty colleagues. Clearly, tensions exist between these two groups.

While this tension does exist in the context of agricultural research earmarks, as noted earlier, agricultural appropriators do not have to engage in a log-roll to distribute these narrowly defined benefits. In other words, no winning coalition needs to be formed. Hence, for the rest of Congress, there is no opportunity for a quid pro quo. The lack of restraint exercised by agricultural appropriators is therefore costly to the rest of Congress. It is not surprising, then, that there have been repeated efforts to eradicate or limit the growth of agricultural research earmarks.

The first major change occurred in 1977 with the re-authorization of the Department of Agriculture. Title XIV of the 1977 Farm Bill attempted to fundamentally change the way the USDA allocates research grants in two ways. First it introduced a category of competitive peer-reviewed grants, which is currently known as the National Research Initiative (NRI) (7 U.S.C 450i(b)). Second, it empowered the Secretary of Agriculture to come up with a set of rules to administer special research grants more effectively (7. U.S.C. 450i(c)). Under the original 1965 legislation, no formal rules were established for the administration of these grants. In what can be interpreted as an effort on the part of the authorizers to discipline the agricultural appropriators, Title XIV attempted to remove some of the discretion held by appropriators in awarding special grants. In particular, under Title XIV, a pseudo-peer review process was established to vet special research grant proposals. Unfortunately, this process lacks the true advantages of peer-reviewed science because the individual requesting the special grant chooses his own reviewers. At best, it improves the quality of science at the margins. In many conversations with CSREES officials, the authors were told that no special grant has ever been denied on scientific grounds. In contrast, no more than one-quarter to one-third of NRI grant applications, which are subject to a true, competitive peer-review, receive funding (Kaiser 1998a, p. 173). Hence, it is apparent that the pseudo peer-review system established under Title XIV lacks any teeth.

Other attempts have been made by individual legislators to curb agricultural research earmarks. An important motivation behind these efforts has been to increase the amount of research dollars available for agricultural research. Since the mid 1970s, the agricultural research budget has been largely flat in real terms and a growing portion of

this budget has been consumed by earmarks. As shown in Table 1, USDA support for agricultural research has hovered between $230 million to $300 million in constant dollars between 1980 and 2002 while the share of these funds devoted to special grants has increased from 5 percent to 15 percent over this same period. In an effort led by Senator Lugar (R-IN) in 1998, the agricultural authorization committee within the Senate attempted to limit the impact of earmarking on agricultural research by establishing a new, competitive peer-reviewed research grant program. So as to ensure the success of this new program, a new funding stream was created (Kaiser 1998a). Unfortunately, the Senate Appropriations Committee responded to this development by reducing the total amount available for agricultural appropriations by exactly the amount of this new funding stream! The Subcommittee on Agricultural Appropriations then placed a limitation on this new program to redirect its funding to earmarked special grants ("Ag Research"). This example clearly demonstrates how difficult it is to challenge the entrenched interests that support special grants.

Opposition from the executive office

Historically, the President and the Office of Management and Budget have been opposed to earmarking of any kind, including earmarked research at the Department of Agriculture. Indeed, both Republican and Democratic presidents have generally opposed earmarks. A recent example of such opposition can be found in a statement by the White House regarding USDA earmarks in the FY 2001 budget:

> In 2001, USDA funded approximately 300 congressionally earmarked projects for research, education and extension grants to land grant universities. Earmarked research is not subject to merit-based selection processes; therefore these projects do not represent the most effective use of limited Federal funding and often fail to

> address national priorities. The [President's] budget proposes to eliminate funding for these earmarks, saving taxpayers about $150 million.
> *(http://www.whitehouse.gov/omb/budget/fy2002/bud10.html)*

To understand why the executive office is generally opposed to earmarked agricultural research, it is necessary to consider the different incentives faced by an individual legislator and the President. The President's constituency is the whole of the United States. Thus, he would like to see broadly-based public goods provided in order to increase his political support and he will tend to eschew narrowly defined projects for which the overall costs exceed the overall benefits[13]. In contrast, an individual legislator has a very narrowly defined constituency (*i.e*. his electoral district). As mentioned earlier, in order to maximize the chances of re-election, an individual legislator prefers to fund narrowly defined projects that deliver benefits to his constituents while dispersing the costs of the project across the entire population. Thus, it is not surprising that while individual legislators are often in favor of earmarked research, the President is not.

Unfortunately, because Congress controls the purse strings, earmarked special grants continue to flourish. While the budget process begins with the President, it requires Congressional consent. By law, public money cannot be spent without the approval of Congress. This gives appropriators an opportunity to re-insert politically valuable earmarks that are removed by the President. Therefore, in this context, unless appropriators can agree to refrain from earmarking research funds for political advantage, it seems likely that special research grants are here to stay, regardless of the pressure exerted by the President, the academy, and other interests to curb earmarked research.

[13] There are, of course, some exceptions. For example, steel tariffs.

V. PATH-DEPENDENCY AND EARMARKED RESEARCH

As North (1990), Krueger (1990), and others have observed, once government policy is enacted, it tends to take on a life of its own. Political actors that benefit from the policy become key constituencies in favor of its persistence, and the policy begins to serve objectives that were never intended by its original sponsors. Additionally, because interests in the policy become entrenched, the policy becomes very difficult to eliminate even if it imposes significant costs on society. An important question for us to address is whether the policy outcomes created by PL 89-106 were path-dependent. In other words, in the absence of PL 89-106, would federal agricultural research funds have become so politicized?

Clearly, members of Congress always face enormous pressure to deliver narrow benefits to their constituents in order to maximize their chances for re-election. Hence, whenever Congress has discretion over the allocation of public funds, it faces a powerful incentive to use this money to further its political objectives. In the context of agricultural research, however, it is important to note that, prior to 1965, Congress did not have much discretion over the allocation of agricultural research dollars. As noted earlier, before the enactment of PL 89-106, federal research funds for agricultural research were distributed either through block grants or contracts.[14] Because block grant allocations were set by a formula, Congressional discretion over the distribution of agricultural research funds was limited. While Congress could always change the formula, politically this was

[14] While it is true that under PL 85-934 of 1958, the USDA had expanded grant making authority, these grants could only go to non-profit institutions conducting *basic* research. In contrast, most special grants authorized under PL 89-106 are for *applied* research. According to its testimony (U.S. House 1963), the USDA was constrained in its ability to make grants under PL 85-934 because it felt that the distinction between basic and applied research was ultimately arbitrary. PL 89-106, by eliminating this distinction,

enormously difficult. Hence, it would have been extraordinarily hard to employ block grants for narrow political purposes. While it is possible that contracts could be used for narrow political gains, contracts were not useful in the context of agricultural research because, as the USDA itself noted in its testimony, it is very difficult to specify a research contract. Indeed it was for precisely this reason that the USDA sought the authority granted by PL 89-106 in the first place. Thus, we believe that had Congress not enacted this legislation, there would have been far less opportunity for the politicization of agricultural research funds.

Given the incentive faced by legislators to channel public funds for narrow political gains to achieve re-election advantage, it is also worth asking why all federal research dollars are not earmarked. As we noted at the beginning of this paper, earmarking of federal research funds, while not unique to the USDA, is far less prevalent at the NSF and the NIH.[15] While there are many reasons for this divergence it would appear that an important factor is the relative independence enjoyed by the NSF and the NIH as compared to the USDA and the ongoing political pressure from the academy and the medical profession to maintain that independence. Since their inceptions as research agencies, the NSF and the NIH have recognized the importance of peer review, specifically, that the "determination of what research activities deserved federal assistance should be made by men and women who were themselves competent in the sciences covered" (Lomask 1975, p. 74). With the decline of science at the USDA it has

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removed this constraint. Hence, the rise of earmarked special grants for agricultural research as we know it could not have occurred without the additional authority created by PL 89-106.

[15] As Vannevar Bush stated: "To persuade the Congress of these pragmatically inclined United States to establish a strong organization to support fundamental research would seem to be one of the minor miracles." Quoted in Lomask (1975, insert).

become apparent that decisions about the allocation of research funds need to be made by experts if the quality of scientific research is to be maintained (NRC 1972, 1989, 2000, 2002, 2003); thus, in an effort to preserve the autonomy of the NSF and the NIH, the organized interests that support these agencies have worked hard to ensure that legislation like PL 89-106 is not foisted on these research agencies.

VI. CONCLUSION

This paper details the unintended consequences of PL 89-106, the law that appropriators invoke to fund earmarked special research grants at the USDA. While this legislation was not intended to generate opportunities for political pork, we show that, once special grant authority arose, it created an incentive and an avenue for individual legislators to bring home narrowly defined benefits to their constituents at the cost of the population at large. This is in spite of intense pressure from the executive branch, members of the scientific community, agricultural stakeholders, and individual legislators. Because Congress has the power of the purse, the only way agricultural research earmarks can be eliminated is if appropriators collectively resist the temptation to earmark funds for politically valuable but socially costly research projects. We are therefore not optimistic that earmarking will be discontinued.

There is considerable concern today about the quality of agricultural research funded by the USDA. Beginning with the Pound Report in 1972, earmarked science has come increasingly under scrutiny by the scientific community. Because earmarked special grants serve political rather than scientific objectives, the quality of research

funded through special grants is questionable. This diminishes the reputation of USDA, which has led to an erosion of the autonomy of this agency.

Furthermore, because most earmarks are rooted in the conference reports of the budget, Congress generally does not vote directly on them. Instead, a minority within Congress has the power to determine which projects are funded. This outcome arises because the position that appropriators occupy within the budgetary process allows them to coerce the USDA to carry out its preferred research allocations. This is in sharp contrast with the typical distributive politics account of how pork is delivered because no majority log-roll is necessary for appropriators to bring the bacon home to their districts. Hence, earmarks represent not merely a challenge to the quality of science, but they also enable a minority to exploit the majority without having to form a winning coalition.

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Table 1. USDA support for agricultural research, 1970-2002

A. In thousands of constant dollars (1984=100)

Year	Formula Funds	Competitive Grants	Special Grants	Contracts and other support	Total
1970	143,227	0	4,075	17,974	165,276
1975	150,461	0	19,520	21,721	191,702
1980	146,995	11,505	11,246	60,728	230,474
1985	174,937	10,701	18,956	34,244	238,838
1990	154,606	25,140	38,394	44,462	262,602
1994	144,571	42,201	46,668	58,728	292,168
2002	120,980	42,817	33,669	35,901	233,367

B. In percentages

Year	Formula Funds	Competitive Grants	Special Grants	Contracts and other support	Total
1970	87	0	2	11	100
1975	78	0	10	12	100
1980	64	5	5	26	100
1985	73	5	8	14	100
1990	59	10	15	16	100
1994	50	14	16	20	100
2002	52	18	15	15	100

Source: Data from 1970 until 1994 was taken from Table 2 of Economic Research Service (1996) with authors' calculations. Data for 2002 was taken from the Current Research Information Service website.

Table 2: Normal form representation of stage game and the derivation of discount factor

		USDA: C	USDA: NC
Appropriators	L	A, c	C, a
	S	B, d	C, b

Recall that appropriators have the following preferences over outcomes: *(L, C),* is preferred to *(S, C)* which is preferred to *(L, NC)* which is indifferent with *(S, NC)*. Hence, $A > B > C$. The USDA, meanwhile, has the following preferences over outcomes from best to worst: *(L, NC), (S, NC), (L, C), (S, C)*. Hence, $a > b > c > d$.

For the sake of completeness, we outline the trigger strategy. It is as follows:

Appropriators: Play *L* as long as USDA plays *C*. If USDA plays *NC*, play *S* in every subsequent period.

If the USDA's discount factor $\in (0,1)$ is $> \frac{a - b}{a - c}$, then the trigger strategy supports (*L, C*) as an equilibrium outcome in the repeated game.

Table 3: Membership on the 1968/69 Senate Subcommittee on Agricultural Appropriations

Democratic Majority Members
*Holland (FL)—Chairman
*Russell (GA)
Hayden (AZ)
*Hill (AL)
*Stennis (MS)
McGee (WY)
Proxmire (WI)
*Yarborough (TX)
*Ellender (LA)
*Eastland (MS)
Republican Minority Members
Hruska (NE)
Young (ND)
Mundt (SD)
Javits (NY)
Aiken (VT)

* Denotes southerner.

Table 4: Descriptive Statistics

	Mean	Standard Deviation
Earmarks (in thousands of 1984 dollars)	710.96	966.84
House Ag. Approps. Subcommittee member	0.23	0.42
Senate Ag. Approps. Subcommittee member	0.22	0.42
Member from both House and Senate on Ag. Approps. Subcommittee	0.06	0.23
House Ag. Committee member	0.55	0.49
Senate Ag. Committee member	0.34	0.48
Member from both House and Senate on Ag. Committee	0.26	0.44

Table 5: Relationship between committee membership and special grants (in thousands of constant 1984 dollars) for fiscal years 1984, 1986, 1990, 1992, 1994, 1996, 1998, 2000 and 2002 combined

	(1)	(2)
Constant	-92.64**	-199.85***
	(41.38)	(47.91)
Senate Ag. Approps. Subcommittee Member	419.83***	360.62***
	(66.69)	(69.99)
House Ag. Approps. Subcommittee Member	200.92***	177.30***
	(62.23)	(64.11)
Member from both	466.36**	497.69***
	(185.71)	(187.09)
Senate Ag. Committee Member		110.45
		(88.39)
House Ag. Committee Member		206.98***
		(58.47)
Member from both		-128.38
		(112.37)
Adjusted R-squared	0.37	0.39
F-statistic	25.03***	21.57***
Number of observations	450	450

Notes: ***, **, * denote statistical significance at the 99 percent, 95 percent, and 90 percent levels respectively. Heteroskedasticity-consistent standard errors are in parentheses.

Appendix 1. Public Law 89-106

AN ACT

To facilitate the work of the Department of Agriculture, and for other purposes.

Sec. 2. The Secretary of Agriculture is authorized to make grants, for periods not to exceed five years' duration, to State agricultural experiment stations, colleges, universities, and other research institutions and organizations and to Federal and private organizations and individuals for research to further the programs of the Department of Agriculture. Each recipient of assistance under this section shall keep such records as the Secretary shall prescribe, including records which fully disclose the amount and disposition by such recipient of the proceeds of such grants, the total cost of the project or undertaking in connection with which such funds are given or used, and the amount of that portion of the costs of the project or undertaking supplied by other sources, and such other records as will facilitate an effective audit. The Secretary of Agriculture and the Comptroller General of the United States or any of their duly authorized representatives shall have access for the purpose of audit and examination to any books, documents, papers, and records of the recipients that are pertinent to the grants received under this section.