THE EFFECT OF CORPORATE STRUCTURE ON FORMULARY DESIGN: THE CASE OF LARGE INSURANCE COMPANIES

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Abstract

OBJECTIVE: To test the hypothesis that the corporate structure of large health insurance companies affects formulary design. By choosing what is solely at the discretion of pharmacy benefit managers (PBMs), their national formularies, as the dependent variable, rather than the generic utilization rate, the need to factor out extraneous demand factors was minimized. **METHODS:** The 2005 published formularies of the following three groups were examined: a) the national formularies of three large independent PBMs; b) the formularies of five large insurance companies that have contracted with these large PBMs to managed their drug benefit plans; and c) the formularies of three large insurance companies that manage PBM functions internally. Three therapeutic classes -- proton pump inhibitors, COX-2 inhibitors, and second-generation antihistamines – were selected on the basis of widespread claims of the existence of lower cost generics that are therapeutic equivalents. The number of brand name drugs selected for the "Tier 2" was tallied for each formulary across the three selected therapeutic classes. **RESULTS**: There was no significant difference in the number of "Tier 2" brand name drugs in the selected therapeutic classes of formularies of the large insurance companies with differing corporate structures. However, there was significant drop off in the number of brands included in the national formularies of the three large, independent PBMs and the number of brands in the "Tier 2" of final plan formularies chosen by their clients. **CONCLUSION**: Large insurance companies relying on independent PBMs for formulary management take an active role in the design process and neutralize the effect that corporate structure has on the starting point of the design process.

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I have not received any remuneration for this paper. I have no financial interest in any company cited in this working paper.

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Introduction

Health care plan sponsors often contract with pharmacy benefit managers (PBMs) to assist them in the design of the drug benefit portion of these plans. Independent PBMs have come under intense attack in the past few years for not acting in the best interest of their clients. Clients are charging that PBMs are designing formularies that are not cost-effective. They say that PBMs are "rebate chasers" who design-in higher cost drugs just to capture a rebate percentage. The popular press is full of articles touting alternative service providers with transparent business models. Over 22 state legislatures are trying to pass full disclosure PBM fiduciary laws. And yet, there are only two publicly available studies of the effect of corporate structure and business model bias on PBM behavior. We will review these tests in preparation for offering our own test that explicitly uses corporate structure as the independent variable. We also use PBM "owned" national formularies as a more focused dependent variable than generic utilization rates. Finally, we take a detailed look at how the PBM business model serves as the complex link between corporate structure and discretionary PBM behavior.

Review of Prior Studies

There have been two publicly available studies that attempt to find evidence of PBM "self-dealing" or "conflict of interest" with a third due in June of 2005 by the Federal Trade Commission (FTC). Previous studies have chosen generic utilization rates as the dependent variable and channel of distribution as the independent variable. The idea, not fully developed in either study, is that independent PBMs have more opportunity to exercise discretion in formulary compliance when managing their own captive mail order pharmacy than when managing a retail pharmacy network. The time-to-fill factor leads to more "bad" switches – costly brands replacing generics—and less "good" switches – generics replacing costly brands. The hypothesis is that corporate structure and business model bias causes a lower generic utilization rate in mail order than in retail. The relative impact of "bad" and "good" switches on generic utilization rates was never discussed in either study.

Any credible study using these two variables must consider the fact that patients with chronic illnesses tend to require brand name drugs and tend to get their prescriptions through the mail because of the

availability of 90-day prescriptions. The initial study in this area by Maness and Langenfeld has been summarily dismissed because they failed to control for the channel effect on drug mix. [1] The study by Wosinska and Huckman did control for this effect.[2] Furthermore, they also broke down compliance into its two major types – generic substitution and therapeutic interchange – and considered the possibility that generic substitution and therapeutic interchange might move in opposite directions in mail order. Namely, captive mail order operations do more generic substitution than retail because of the time-to-fill factor and less therapeutic interchange because of the business model bias. However, they found that the generic substitution rate was virtually the same in each channel. After accounting for the channel effect on drug mix, Wosinska and Huckman found no significant difference between generic utilization rates for the two channels of distribution.

The problem with aggregate studies of formulary compliance is that it is all about lack of discretion. There are two types of generic-brand therapeutic interchanges within the framework of formulary compliance. There can be instances of active replacement of a generic with a higher cost brand. This is clearly not in the best interest of clients and exposes PBMs to lawsuits claiming breach of fiduciary duty. Even if this type of active switching runs into the tens of thousands, it represents less than .01% of the 670 million transactions sampled in the Wosinska and Huckman study. We believe that this type of switching can only be detected by detailed audits of individual transactions. The other type of discretionary therapeutic interchange that is available to mail order operations is a non-activity. It is not taking action to replace a brand drugs with a more cost-effective generic that is a therapeutic equivalent. Because the Wosinska and Huckman study looks for differences by channel rather than by corporate structure, it is not a test of what independent PBMs do, but at test of what they don't do. Measuring such differences might be too subtle to be detected by statistical tests of averages.

The other problem is that both studies failed to realize that corporate structure is the root cause of business model bias. The Wosinska and Huckman study lumped together data from large, independent PBMs with data from Pacificare – an insurance company with a captive PBM. They failed

to calculate separate statistics for Pacificare and to test for differences due to corporate structure within each channel.

There is a PBM 'conflict of interest' study due in June of 2005 from the FTC.[3] Descriptions of the scope of the study clearly indicate that the FTC is aware of the corporate structure variable and that they intend to use it to explain variations in generic utilization rates. Because of the power of the FTC to command firms to supply any data required, this should be the definitive study of the effect of corporate structure on formulary compliance. However, it will still be open to criticism by using aggregate generic utilizations rates as the dependent variable for PBM discretionary behavior.

PBM Corporate Structure

There are a variety of corporate structures under which PBMs operate. In 2005, the three largest PBMs were publicly held independents – Caremark Rx, Medco Health Solutions, and Express Scripts, (known as "The Big 3"). Together, they control approximately 50% of all outpatient prescriptions filled through retail and mail order channels. There are also independent PBM operations owned by CVS and Walgreen, both large drugstore chains. Some, but by no means all, of the largest insurance companies have found it economic to have their own captive PBM operations rather than contract out. Later in this paper, we identify possible reasons why some insurance companies contract out while others have their own captive operations. However, this paper does not try to explain variations in corporate structure, only the effect of such variations on PBM performance. Wellpoint, Aetna, CIGNA, Pacificare and Prime Therapeutics, a PBM jointly owned by a number of Blue Cross Blue Shield (BCBS) licensees, are the premier examples of insurance companies that have set up their own captive PBM operation.

Plan sponsors can also contract out management of drug benefits plans to operations known as pharmacy benefit administers (PBAs) and group purchasing organizations (GPOs). PBAs focus only on retail network administration and claims processing. Unlike PBMs, these administrators do not "own" retail and mail order transactions and hold no rights to receive rebates. PBAs generally do not

represent their clients in rebate negotiations as this function is undertaken by federal and state agencies. GPOs are a new entrant to the managed care pharmacy market. Their focus is on rebate negotiation, but their business model is 100% fee-based. It is a mystery to us how GPOs can claim rebate negotiation as their core competency, yet are vague as to how involved they will be in formulary design and compliance. PBAs and GPOs are not particularly relevant to a study of effect of corporate structure on discretion in formulary design and compliance.

Table 1 lays out the variability of corporate structure examined in this study.

Table 1: 2005 PBM Formularies Examined in Study

Insurance Companies with Captive PBMs	Insurance Companies Contracting with Independent PBMs	Independent PBM Contractor
Aetna Health	Humana ->	CaremarkRx
CIGNA HealthCare	Coventry Health Plan ->	CaremarkRx
PacifiCare	UnitedHealth Group ->	Medco Health Solutions
	Oxford Health Plans ->	Medco Health Solutions
	Mutual of Omaha ->	Express Scripts

We believe that restricting our study to large insurance companies with diversified client bases causes market and demographic particularities of individual clients to average out. This is why it was important to restrict the sample to insurance companies of roughly the same size and target market. A separate study of the effect of PBM corporate structure using data from the "Blues" would be a very interesting complement to this study. This future study would compare formularies designed by those BCBS licensees that have an ownership interest in Prime Therapeutics with formularies designed by BCBS licensees who contract with the Big 3. It might also include formularies designed by Wellpoint, largest BCBS licensee who also happens to have its own captive PBM operation.

The PBM Business Model – The Link Between Structure and Performance

Cost-effectiveness is the overriding goal of health care plans and their PBM operations, whether captive or independent. Drug benefit costs are commonly expressed as per member / per month costs

(PMPM). This is the product of "three U's" – Usage, Utilization mix, and Unit prices. There is emerging a body of research focusing on the trade-offs and/or bias on the part of institutions charged with managing the three "U's" of PMPM. There are several good studies that compare PMPM between Medicaid-fee-for-service plans with Medicaid MCO plans managed by private sector PBMs. [4] These studies show that different institutions focus on one "U" at the expense of the other. Namely, Medicaid fee-for-service plans focus on rebates at the expense of utilization rates to that point that they produce higher PMPM than Medicaid MCO plans managed mostly by the Big 3. This paper is similar to those Medicaid studies except that we focus narrowly on formulary design rather than PMPM and we explicitly consider the role of business models as the link between structure and performance.

A business model embodies decisions made by a company as to its core competency coupled with decisions as to how it generates revenue. The overriding focus of both captive and independent PBMs is to control PMPM. However, independent PBMs acknowledge that their core competency, and we might add, competitive advantage relative to smaller entities, lies in controlling prices as opposed to utilization rates. Medco states this explicitly in the following statement taken from a recent report to investors: [5]

> Our business model is designed to reduce this level of drug trend, primarily by obtaining competitive discounts and rebates from pharmaceutical manufacturers, obtaining competitive discounts from retail pharmacies and efficiently administering prescriptions filled through our mail order pharmacies.

We believe that "conflict of interest" may too strong a term to apply to the business model of independent PBMs. Competition works toward maintaining PMPM parity between captives and independents, but different PBMs choose to achieve this overriding goal differently. Independents exploit their size advantage and focus on rebates, while captives focus on utilization rates to compensate for their lack of clout in the rebate area. Using the jargon of economists, PBMs make a business model decision of where it wants to be along the PMPM "isocost curve" based on its competitive advantage in rebate negotiations. This isocost curve maps out the trade-off between generic utilization rates and average rebates received per branded scripts. After the 3rd quarter of 2004, Medco disclosed to investors for the first that it received gross rebates from brand drug manufacturers that averaged $8.20 per branded script. [6] Roughly half represented market share

rebates and the other half represented volume rebates. They also disclosed that the generic utilization rate of their clients averaged 46.8%.

An insurance company deciding to change PBM corporate structures would incur significant one-time costs and so the expected reduction in PMPM also would have to be significant for this decision to be made. While there is a certain amount of inertia created by these one-time costs, we would expect to see a steady stream of switches if there were a significant disparity in PMPM. The fact that there is not a significant amount of movement by large insurance companies to change corporate structures is evidence that there is parity in PMPM between independents and captives. Some might argue this point in the case of the "Blues". Prime Therapeutics, a captive PBM operation, has doubled in size in the last five years by attracting "Blues" who had been contracting out to the Big 3. But, this case is unusual, as the decision by a "Blue" to switch to Prime Therapeutics involves an equity investment that probably is not as high as the typical start-up costs involved in creating an in-house PBM operation.

Medco Health Solutions has made some recent disclosures that provide unprecedented evidence of the importance of rebates to the gross profits of independent PBMs. On October 28, 2004, Medco Health Solutions, Inc. disclosed to the public for the first time a statistic that we have named as the rebate retention rate. Chief Financial Officer, Jo Ann Reed, announced at an investor's conference that Medco's rebate retention rate was 40.5% of $754 Million.[7] Based on that disclosure, it is possible to derive with certainty that 71.7% of Medco's gross profits came from retained rebates from branded drug manufacturers.[8] While Medco's overriding long-term focus has to be client PMPM, its business model has been built intentionally around rebates. Medco intentionally uses its competitive advantage in rebate negotiations to offset aggressive, sometimes "predatory", pricing of claims processing and mail order prescriptions.[9]

Size and Insurance Company 'Tastes" as Corollaries of PBM Structure

There are two variables that may be highly correlated with PBM corporate structure. This correlation might cloud any conclusions about the root cause of variations in PBM behavior. It is possible that we are not testing for the effect of corporate structure on formulary design, but the effect of PBM size or insurance company "taste". PBM size, as measured by covered lives, is highly correlated with corporate structure. The Big 3 independents each cover over 50 million lives whereas the captive PBMs of insurance companies cover between 5 million and 15 million lives. Historically, the primary reason for contracting out for PBM services was to gain claims processing economies of scale. Today, this is not the case as there are application software providers that will provide this service on a transaction fee basis. The primary advantage that PBM scale provides today is rebate-negotiating power with brand name drug companies. It could be that size, rather than corporate structure, causes PBMs to move along the PMPM isocost curve. However, it may never be possible to distinguish empirically between these two factors. All studies in this area might have to include the *caveat* that the explanatory variable may be size and not corporate structure.

It could be that the reason one insurance company has a captive PBM operation while another chooses to contract out to the Big 3 has to do with "tastes". Insurance companies may recognize that both captives and independents are capable of producing the same PMPM, but that the Big 3 can achieve this with a lower generic utilization rate offset by higher rebates. Insurance companies with clients adverse to controls on drug choice might choose to contract out, whereas insurance companies with clients less adverse to controls might choose to bring PBM function in-house. While we think that "taste" may be factor among individual clients, the diversified client base of large insurance companies would tend to average this factor out.

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PBM Discretion in Formulary Design

In other papers, we have identified four areas where PBMs exercise discretion in formulary design: (1) the initialization of the design process with a national formulary "owned" by the PBM; (2) the "granularity" of the formulary; (3) the financial modeling software used to assist clients in customizing

their own plan formulary; and (4) the actual formula used to distribute rebates to clients after rebate retention. [10] [11] Our aim is to develop a test that focuses on observable PBM discretionary behavior. PBM financial modeling software and rebate re-distribution formulas are proprietary and would only be observable as unverifiable antidotes, which nevertheless, may be useful information as "stylized facts" used in developing academic theories of drug rebates. Only the FTC and government lawyers now have access to information about PBM financial modeling software and drug rebate contracts.

The dependent variable of our test is observable data on PBM national formularies. PBMs offer their national formularies to clients as a starting point in the development of their own formulary and drug benefit plan. Generally, such elements as co-payments and "prior authorization" requirements are part of the plan design rather than the formulary design, and hence are discretionary acts of the plan sponsor. But even on occasion, these elements are built into national formularies by the PBM. The basic point is that PBMs exercise some discretion when they assist sponsors in the overall design of drug benefit plans.

PBMs say that plan sponsors makes all key decisions regarding the design of the benefits plan, and in particular, the design of their formularies. However, PBMs do not present their clients with a blank look-up table and ask them to populate each of 60 to 80 formulary classes from the list of drugs approved for safety and efficacy by a pharmacy and therapeutics committee. PBMs do acknowledge "ownership" of their own formularies that serve as a starting point in the design process. Also, PBMs do not simply present plan sponsors with the entire set of manufacturer rebate schedules and ask them to make final choices based on that information. They have developed proprietary financial modeling software that they use in assisting clients to make formulary choices. Quoting from a PBM white paper on formulary design, [12]

> Express Scripts' plan sponsors often adopt Express Scripts-developed formularies as their own or use them as the foundation for their own custom formularies.
>
> Throughout the process, Express Scripts provides consultative services, including financial modeling, to the plan sponsors and the plan sponsor ultimately decides what plan to offer.

A Theory of Market Share Rebates

We have established that PBMs exercise discretion in formulary design and that large, independent PBM have a tendency to favor rebates at the expense of generic utilization rates as long as the PMPM delivered to clients is competitive. What remains is the establishment of the link between the PBM business model and discretion in formulary design. That link is a theory of why drug manufacturers offer rebates in the first place.

One must also keep in mind that there are two rebate formulas because there are two rebate transactions – one between drug manufacturers and PBMs and the other between PBMs and clients. In tracing the relations between corporate structure and formulary design, it is important to realize that PBM designed formulas are discretionary acts that may reinforce or dilute the intent embodied in drug manufacturers' rebate formulas. In the conclusion section, we briefly discuss the reasons why clients might fail to follow the recommendations of their independent PBM contractor. We assume that clients make customization changes to the national formulary on the basis of cost and benefits, where costs are losses in rebates and benefits are increased generic utilization rates. Because both formulas are proprietary, it is impossible to pinpoint which rebate formula might be the source of any disconnect between structure and performance. This limits any conclusions we might draw from this study.

PBMs receive two kinds of rebates: volume, or formulary rebates, and market share rebates. Volume rebates are a fairly common occurrence in business. The use of market share rebates by manufacturers is fairly rare. We believe that the dual use of volume rebates and market share rebates is extremely rare in American business. The language currently found in industry literature describes rebates in terms of their role in influencing formulary placement and preference in order to shift market share among existing brand drugs that are therapeutic equivalents. Market share rebates are clearly offered only if a drug faces existing competition from therapeutic equivalents. Furthermore, this theory suggests that rebates receipts would be more if a drug were placed in "Tier 2" as opposed to "Tier 3" in the formulary. This implication is important to our test because it uses the count of brand name drugs in "Tier 2" as the dependent variable. Market share rebate formulas map out the relation between PBM

performance and rebate reward. If the shape of this function were "binary" rather than "marginal", then our test would be deficient as there would be no additional incentives for PBMs to place a drug in "Tier 2" as opposed to "Tier 3".

We now take a closer look at an alternative theory of market share rebates that would tend to undermine our use of tier preference as a dependent variable.[13] The motivation for offering drug rebates may have little to do with competition among existing therapeutic equivalents, but everything to do what we call barriers to "enantiomeric" entry. This barrier is created by a rebate formula that is more binary, or "F" shaped, than marginal, or "S" shaped. The following example demonstrates how this barrier is created. Assume a PBM is currently receiving a 15% rebate for a delivering a market share of 50%. The shape of the formula is such that there is little additional incentive for increasing share coupled with a huge drop off in rebate percentage should the share slip below 50%. The only way for a new entrant to gain, say a 20%, would be to offer the PBM a minimum rate of 37.5%, which is 7.5% normalized for the whole market. This is equivalent to what the PBM is currently receiving – 15% for a 50% share or 7.5% normalized. Market share rebates serve as a barrier to entry because the minimum rate a new entrant would have to pay would make the entry unprofitable.

Both the inclusionary and exclusionary theory of market share rebates suggests that brand manufacturers pay such rebates only selectively. But, the two theories have different implications for the effect of corporate structure on formulary design. The exclusionary theory implies that drug manufacturers only look for rebates to preserve the market for existing drugs and do not care whether their drug is preferred or not, only that is not banned outright from formularies. Direct-to-consumer advertising then becomes the preferred method to move market share among existing therapeutic equivalents. If this is true, then tier preference is a poor indicator of business model bias. This possibility is a *caveat* to any conclusion we might draw from our results.

A Test for The Effect of Corporate Structure on Formulary Design

The test consisted of examining the national formularies of the three largest independent PBMs in 2005 – CaremarkRx, Medco Health Solutions, and Express Scripts. One of the problems encountered is that large independent PBMs do not have a single national formulary. They often have both a 2-tier and a 3-tier formulary. They also often have a more restrictive formulary for HMO clients and a less restrictive one for PPO clients. We focused on three therapeutic classes -- proton pump Inhibitors, COX-2 inhibitors, and 2nd generation antihistamines -- from among the top 10 classes in sales. Brand name drugs in these classes face competition from both generics and other brand name drugs that are therapeutic equivalents. Research pharmacists have repeatedly questioned the cost-effectiveness of brand name drugs in these three classes. If PBM corporate structure has an effect on formulary design, it is most likely to show up in the design of these three therapeutic classes. To capture the variability of corporate structure, we compared the selected therapeutic classes of formularies of 3 large insurance companies with captive PBMs and 5 large insurance companies using large, independent PBMs. Table 2 below summarized the design of our test for the effect of corporate structure on formulary design:

Results:

There was no significant difference in the number of "Tier 2" brand name drugs selected by large insurance companies with differing corporate structures in the three therapeutic classes examined. However, there was significant drop off in the number of "Tier 2" brands in the national formularies of the Big 3 and the number of "Tier 2" brands in final plan formularies chosen by their clients. The drop-off was almost total for COX-2 inhibitors and 2nd generation antihistamines. While there was little drop-off in the sheer number of "Tier 2" proton pump inhibitors, plan sponsors imposed all kinds of restrictions on usage. It is also interesting to note that independent PBMs preferred multiple brand drugs in each of these therapeutic classes. We will discuss in the next section the implications this might have for a theory of drug rebates. Table 3 is a full listing of the results:

Table 2: Test Methods	Previous	Current
Discretionary PBM Activity:	Formulary compliance through therapeutic interchange.	"Owned" national formulary used as starting point in design process.
Independent Variable:	Rx fulfillment channel: retail or mail order	PBM corporate structure: captive or independent
Dependent Variable:	Generic utilization rate.	Number of “Tier 2” brand drugs in client formulary in 3 selected therapeutic classes.
"Ceteris paribus"	Channel effect on drug preference. Generic substitution.	PBM size. PBM rebate re-distribution formula Insurance company 'taste' for degree of managed care.
Logic:	Independent PBMs can exercise more, or less, discretion in mail order than retail because of the time-to-fill factor.	Corporate structure affects choice of business model. The choice is not "either/or" , but a trade-off between utilization rates and rebates along the same PMPM isocost curve.
Criticism:	These tests are too aggregate to detect the effect of intentional cost-increasing therapeutic interchange. They are not tests of what PBMs do, but what they don't do.	Gross rebate receipts are not dependent on “Tier 2” versus “Tier 3” preference. The intent of rebates is to form a barrier to "me-too" drug entrants rather than to stimulate share-shifting among existing therapeutic equivalents.

Table 3: Formulary Tier 2 Preference in Selected Therapeutic Classes

Tier 2	KEY:	Proton Pump Inhibitors					COX-2 Inhibitors		2nd Generation Antihistamines	
		Aciphex	Prevacid	Protonix	Nexium		Celebrex	Bextra	Allegra	Clarinex
	X - Tier 2 Preferred / No Restrictions									
	Preferred with following restrictions									
	PA - Prior Authorization QL - Quantity Limits									
	"Owned' Formularies of Independent PBMs									
4	Caremark Rx Primary/ Preferred Drug List (4/2005)		X		X		X		X	
6	Medco Preferred Prescription Formulary (2005)			X	X		X	X	X	X
6	2005 Express Scripts National Preferred Formulary		X		X		X	X	X	X
	Formularies of Insurance Co's with Indep PBMs									
0	Humana Rx3 Drug List 2005 (Caremark Rx)									
1	Coventry Non-Preferred Alternative List 2005 (CaremarkRx)			PA						
4	Oxford Health Plans PDL 2005 (Medco)	PA/QL		PA	PA					QL
3	UnitedHealth Group 2005 PDL - 3 Tier (Medco)	QL		QL	QL					
2	Mutual of Omaha 2005 Drug Formulary (Express Scripts)			X			PA			
	Formularies of Insurance Companies with Captive PBMs									
2	Aetna 3 Tier Preferred Drug List (January 2005)	PA	PA							
2	Cigna 3 Tier Drug List (4-28-05)		PA	PA						
4	PacifiCare - Rx Solutions Formulary	PA/QL		PA/QL					PA	PA

Conclusion:

Large insurance companies relying on independent PBMs for formulary management take an active role in the design process and neutralize the effect that corporate structure has on the starting point. This result is not a case of market failure requiring government intervention. On the contrary, it is a case of the self-correcting nature of free markets. Relations with contractors are usually accompanied by a health dose of "caveat emptor" backed by some investment in information and a willingness to demand changes if dissatisfied with the initial delivery.

It is reasonable to assume that insurance companies take a cost-benefit approach to customizing the national formulary presented to them. It follows that the changes documented in Table 3 must have improved PMPM in the minds of clients or they would not have done it. But, this creates a dilemma. On the one hand, we believe that the overriding goal of independent PBMs is delivering a competitive PMPM. We cited lack of any current trends toward switching corporate structures, except in the atypical "Blues" case, as evidence that the Big 3 are delivering on this promise. However, we conclude that, in three therapeutic classes, plan sponsors are compelled to change what their contractors deliver in order to improve PMPM. Of course, one way out of this dilemma is to conclude that this customization is just a trade-off along the PMPM isocost curve. Another is to minimize the materiality of the changes on overall PMPM as it takes place in just 3 therapeutic classes. However, these 3 therapeutic classes represent 10% of all drug sales in 2003 so the lack of materiality argument does not hold up.[14]

We must also consider the cost-side as a factor in customization decisions. It may be that the changes are not so much due to benefits gained, but lack of rebates lost. Our earliest paper on PBM discretion in formulary design assumed a tight relation between the two rebate formulas.[15] We assumed that market share rebates provided tremendous incentives to give one brand name drug exclusive preference in a therapeutic class. An "efficient" way for PBMs to maximize rebates received would be to subject clients to what we called a "marginal" distribution formula. This formula stipulated that clients would start out with a rebate percentage for adhering to the national formulary, but would be penalized for the "marginal consequences" for any deviation. These marginal consequences could be

overwhelming because the basis for market share rebates is the share delivered by the total client base. For example, deviations from the national formulary by one client could reduce the rebate percentage to all by a tenth of a point. The marginal consequences to an individual client are much more than a loss of a small percentage times a client's own use of a drug, but the same percentage times a basis that is 100 times larger.

Evidence that national formularies are designed with multiple "Tier 2" preferences is inconsistent with our initial ideas about the functionality of the rebate re-distribution formula. It is highly doubtful that PBMs employ a marginal contribution formula that penalizes clients severely for deviating from the national formulary. Rather there is some antidotal evidence that PBMs present clients with milder incentives such as a percentage based on a client's own market share or a fixed dollar amount per prescriptions. We also believe that evidence of multiple "Tier 2" preferences in national formularies cast doubt on the theory of rebates as share-shifting devices. If drug manufacturers intend for rebates to "move markets", why are PBMs not motivated sufficiently to limit "Tier 2" preference to a single drug, other than the need to cover a range of outcomes? Conclusions drawn from this study must be tempered without a better understanding of the intent of market share rebates as embodied in the functionality of rebate formulas.

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(12) Express Scripts, Inc. *White Paper: Formulary Management at Express Scripts.* Available at www.express-scripts.com/ourcompany/news/formularyinformation/development/formularyDevelopment.pdf (Accessed at 5-5-05)

(13) D Mills, "Market Share Discounts", Working Paper, April 2004. Available at www.virginia.edu/economics/papers/mills/Market%20Share%20Discounts.pdf (Accessed at 5-5-05)

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URLs of formularies used in this study:

Independent PBMs

Medco Health Solutions: (accessed 5-1-05)
http://www.medco.com/art/corporate/medco_formularies_2004.pdf

Express Scripts: (accessed 5-1-05)
http://member.express-scripts.com/web/formulary/OpenFormulary.do?portal=member&formularyId=393

Caremark Rx: (accessed 5-1-05)
http://www.caremark.com/portal/asset/Primary_Preferred_DL.pdf

Insurance companies contracting out to independent PBMs

Humana (Caremark): (accessed 5-1-05)
http://apps.humana.com/prescription_benefits_and_services/execreq.asp?processcode=1&srcsite=home

Coventry Health (Caremark): (accessed 5-1-05)
http://www.chcga.com/content/items/9667/2005NonPreferredAlternatives.pdf

Oxford Health (Medco): (accessed 5-1-05)
https://www.oxhp.com/secure/member/home/coverage/three_tier_formulary/drug_list05.html

United Healthcare (Medco): (accessed 5-1-05)
http://www.provider.uhc.com/knightridder/KnightRidder2005PDLClean.pdf

Mutual of Omaha (Express Scripts): (accessed 5-1-05)
http://www.mutualofomaha.com/acrodocs/mug6319.pdf

Insurance companies with captive PBMs

Aetna Health: (accessed 5-1-05)
http://www.aetna.com/formulary/2005_3-tier_mbr_guide.pdf

CIGNA Healthcare: (accessed 5-1-05)
https://secure.cigna.com/health/form/drug_list.html

Pacificare (RxSolutions): (accessed 5-1-05)
http://www.rxsolutions.com/clientformulary/formulary.asp?var=CA&ubfoid=CA