Online Appendix

[Not intended for publication]

"Positively Aware? Conflicting Expert Reviews and Demand for Medical Treatment"

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Appendix A Drug Reviews, Drug Characteristics and Consumption

Though our main analysis focuses on the impact of reviews on the consumption of combinations of drugs, since the expert reviews are at the drug level here we show key patterns emerging when we examine individual drug reviews and consumption. First, we show that higher expert reviews are associated with better objective drug qualities recorded in *Positively Aware*. Second, we show that higher reviews predict higher drug consumption. Third, we examine how reviews evolve over a drug's lifecycle, showing that reviews seem to decline over time and that the decline is partly explained by the introduction of new and better drugs into the market.

Reviews and Drug Characteristics. We first investigate how objective drug qualities as reported in the annual drug guide relate to expert reviews. Table A1 presents results for the relationship between doctor and activist ratings and objective qualities in the magazine. As a first pass, in columns (1) and (2) we regress doctor's and activist's reviews, respectively, on drug characteristics by OLS. We find that, on average, better drugs receive better reviews, as expected. The higher the number of reported side effects and number of drug interactions of a drug, the lower both experts' ratings (though the effects are statistically insignificant). As dosage frequency increases, indicating difficulty in following the drug regimen and increasing the chance of missed doses, both expert ratings decrease. Given that reviews are categorical variables, in columns (3) and (4) we estimate the same relationships using an ordered probit model. We obtain qualitatively similar results.

Reviews and Consumption. To relate reviews to consumption at the drug level, we use individual-level data from MACS to construct drug-level *pseudo* market shares, defined as the fraction of people taking a particular drug out of the total number of HIV+ men in the sample.[1] Table A2 presents the results of the linear regression of drug-level market shares on reviews. Columns (1) and (2) show that both the doctor's and activist's reviews are positively correlated with demand. Column (3) shows that when we control for both ratings together along with drug characteristics, both reviews still predict higher demand. Next,

[1]Note that these are not market shares since patients often take more than one drug at the same time. Hence, our *pseudo* market shares do not add to 1. These variables just measure the number of people that take a given drug normalized by the total number of potential consumers at any given point in time.

we show that average doctor reviews of other drugs in a combo predict lower demand. In Column (4), we add the average of reviews of all other drugs taken by the individual at the same time. While we continue to find that higher reviews by the doctor and the activist predict higher demand for the drug, higher doctor reviews for other drugs in the combination predict lower demand. In other words, when consumers combine drugs, for some drugs in their bundle, higher doctor reviews predict lower demand.[2] This finding is consistent with our main results at to combo level.

Reviews over Drug Lifecycle. In our data, drugs are reviewed every year by two experts and reviews might differ not only across experts but also over time. Here, we look at how reviews for the same drug vary over the lifecycle of the drug. In general, there seems to be a downward trend in reviews from both experts over time, as illustrated in Figure A1, which plots average reviews by drug age.[3]

[2]On the other hand, higher activist reviews for other drugs in the combination predict higher demand for the drug.

[3]Age of the drug is measured as the number of years the drug has been on the market since introduction i.e. drug age = current year − year of introduction.

Appendix Table A1: Relating Reviews with PA Characteristics

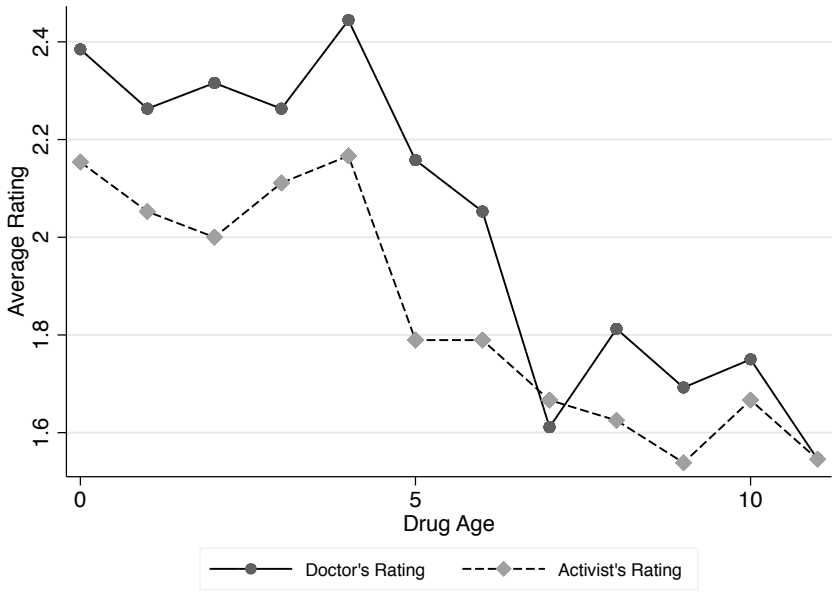
	OLS		Ordered Probit	
	Doctor	Activist	Doctor	Activist
No. of Side Effects	-0.01	-0.00	-0.00	-0.00
	(0.01)	(0.01)	(0.00)	(0.00)
No. of Drug Interactions	-0.01	-0.01	-0.01	-0.01*
	(0.01)	(0.01)	(0.00)	(0.00)
Food Restrictions	-0.01	0.17	-0.00	0.09
	(0.12)	(0.13)	(0.01)	(0.06)
Pill Burden	0.10***	-0.00	0.05***	-0.00
	(0.03)	(0.04)	(0.02)	(0.02)
Dosage Frequency	-0.33***	-0.21**	-0.18***	-0.10**
	(0.08)	(0.09)	(0.05)	(0.04)
Publicly Traded	0.01	-0.24	-0.00	-0.12
	(0.18)	(0.18)	(0.10)	(0.10)
Nobs.	197	197	197	197

Notes: *, **, *** denote p-value < 0.10, 0.05, and 0.01, respectively. Standard errors are given in parentheses. Drug-visit dyad is the unit of analysis. The left-hand-side variable is either Doctor's or Activist's review (taking values 1, 2, or 3). Columns (3) and (4) report marginal effects for the ordered probit.

Appendix Table A2: Relationship between Reviews and Demand - Drug Level

	(1)	(2)	(3)	(4)
Doctor's Review	0.02***		0.01***	0.01***
	(0.00)		(0.00)	(0.00)
Activist's Review		0.03***	0.02***	0.02***
		(0.00)	(0.00)	(0.00)
Average Doctor Reviews of Other Drugs in Combo				-0.01***
				(0.00)
Average Activist Reviews of Other Drugs in Combo				0.01***
				(0.00)
PA Characteristics	Y	Y	Y	Y
Nobs.	33,608	33,608	33,608	33,608

Notes: *, **, *** denote p-value < 0.10, 0.05, and 0.01, respectively. Standard errors are given in parentheses. Individual-drug-visit is the unit of analysis. The left-hand-side variable is drug-level market shares, defined as the fraction of people taking a particular drug out of the total number of HIV+ men in the sample.



Appendix Figure A1: Ratings over Drug Life Cycle: The figure plots the average ratings of drugs over drug age, by expert.

Appendix B Theoretical Model

Let drug $d's$ unobserved quality $\theta \in \mathbb{R}^2$ have two dimensions: drug effectiveness $h \in \mathbb{R}$ and how well it represses side effects $s \in \mathbb{R}$. The utility an individual gets from consuming drug d, conditional on all observed objective qualities $\mathbf{X}$ is given by:[4][5]

$$u_d(h, s|\mathbf{X}) = \alpha h + \beta s + \gamma(\text{AIDS} \cdot h), \tag{1}$$

where AIDS is a dummy for whether the individual is suffering from AIDS and $\alpha > 0, \beta > 0, \gamma > 0$.[6] We assume that the individual does not observe θ, and uses reviews from doctors and activists as signals of the true unobserved quality. Let us assume that h and s can take one of two values, $h \in \{h^H, h^L\}$ and $s \in \{s^H, s^L\}$, where H denotes high quality and L denotes low quality, and doctor and activist comments can either be high or low, i.e., $D, A \in \{0, 1\}$ where 0 denotes low comment and 1 denotes high comment. Then, we can define probabilities for observing quality $t \in \{H, L\}$, conditional on doctor and activist comments as:

$$P_d(h = h^H|R = r) = p_R^r, \tag{2}$$

$$P_d(s = s^H|R = r) = q_R^r, \tag{3}$$

$R \in \{D, A\}, r \in \{0, 1\}$. Moreover, we assume that conditional on both observed and unobserved drug characteristics doctor's and activist's comments are independent. Given this setup, we can now derive theoretical predictions that can be tested empirically.

Proposition 1. *When the doctor and activist agree, individuals choose the drug that gets a high comment, provided that comments are informative.*

Proof. Individuals will choose the drug that gives them the highest expected utility. Suppose drug k gets high comments from both experts, while drug j gets low comments from both experts. An individual, regardless of his AIDS status, will choose drug k iver j when

$$E[u_k(h, s|\mathbf{X}, D, A)] > E[u_j(h, s|\mathbf{X}, D, A)] \tag{4}$$

[4]We write our theoretical model after conditioning on all observed characteristics of the drug to understand how drug demand relates to unobserved qualities of the drug and expert comments. We categorize the drug's unobserved qualities into two dimensions, effectiveness and side effects, which may be correlated with observed measures of drug effectiveness (probability of non-decreasing CD4 count) and side effects (probability of no ailment).

[5]We have suppressed the individual subscript i to simplify notation.

[6]This restriction on preference parameters assumes that individuals prefer drugs that are more effective and have less side effects, and that these are state-dependent preferences for effectiveness, in that individuals with AIDS prefer more effective drugs more (**?**).

$$\Leftrightarrow (\alpha+\gamma\text{AIDS})h^H(p_D^1-p_D^0+p_A^1-p_A^0)+\beta s^H(q_D^1-q_D^0+q_A^1-q_A^0)> \quad (5)$$
$$(\alpha+\gamma\text{AIDS})h^L(p_D^1-p_D^0+p_A^1-p_A^0)+\beta s^L(q_D^1-q_D^0+q_A^1-q_A^0).$$

The last inequality is always true when $p_D^1 > p_D^0$, $p_A^1 > p_A^0$, $q_D^1 > q_D^0$ and $q_A^1 > q_A^0$. In words, both experts are more likely to give a higher rating to drugs that are better on both dimensions. □

Proposition 2. *When the doctor and activist disagree, we will observe differences in responses to conflicts depending on health status if and only if*

1. *individuals without AIDS value low side effects more than high effectiveness ($\beta > \alpha$),*
2. *individuals with AIDS value high effectiveness more than low side effects ($\beta < (\alpha+\gamma)$),*
3. *the activist puts more weight on side effects than the doctor ($q_D^0 > q_D^1$ and $q_A^1 > q_A^0$),*
4. *the relative probability that the activist gives a high rating to a drug that has high h is lower than the relative probability of the doctor doing the same ($(p_A^1-p_A^0) < (p_D^1-p_D^0)$).*

Proof. Suppose the doctor gives a low comment to drug k and a high comment to drug j, while the activist gives a high comment to drug k and a low comment to drug j. Then, an individual without AIDS will choose drug k when

$$\implies \alpha h^H(p_D^0-p_D^1+p_A^1-p_A^0)+\beta s^H(q_D^0-q_D^1+q_A^1-q_A^0)> \quad (6)$$
$$\alpha h^L(p_D^0-p_D^1+p_A^1-p_A^0)+\beta s^L(q_D^0-q_D^1+q_A^1-q_A^0)$$

Given that $h^H > h^L$ and $s^H > s^L$, under these assumptions, equation (15) will be satisfied if $(p_A^1-p_A^0) > (p_D^1-p_D^0)$. If $(p_A^1-p_A^0) < (p_D^1-p_D^0)$, then for equation (15) to be satisfied, $\beta > \alpha$, so that the expected marginal utility from higher s is greater than the expected marginal utility from higher h.

An individual with AIDS = 1 will choose drug j over drug k if

$$(\alpha+\gamma)h^H(p_D^0-p_D^1+p_A^1-p_A^0)+\beta s^H(q_D^0-q_D^1+q_A^1-q_A^0)< \quad (7)$$
$$(\alpha+\gamma)h^L(p_D^0-p_D^1+p_A^1-p_A^0)+\beta s^L(q_D^0-q_D^1+q_A^1-q_A^0)$$

It is easy to see that equation (16) will be satisfied when $(p_A^1-p_A^0) < (p_D^1-p_D^0)$, $\alpha,\beta,\gamma > 0$, and $\beta < (\alpha+\gamma)$, so that the expected marginal utility from higher s is lower than the expected marginal utility from higher h.

Now lets suppose $(p_A^1 - p_A^0) < (p_D^1 - p_D^0)$, $q_D^0 > q_D^1$, $q_A^1 > q_A^0$ and that for people without AIDS $\beta > \alpha$ while for people with AIDS $\beta < (\alpha + \gamma)$.

An individual without AIDS will choose drug k (for which the activist's comment is higher than the doctor's) when equation (15) is satisfied. Given our assumption that $h^H > h^L$ and $s^H > s^L$ and the above conditions, we can see that since $\beta > \alpha$, the LHS of the equation (15) is greater than the RHS. Individuals with AIDS, however, will choose drug j (for which the doctor's comment is higher than the activist's) when equation (16) is satisfied. Given that we assume that $\alpha, \beta, \gamma > 0$, and following the above conditions, we can see that equation (16) is satisfied.

□

Appendix C Data Collection

C.1 *Positively Aware* Data Dictionary

In this section, we present a data dictionary for the constructed dataset from the *Positively Aware* magazines. Below is a list of variables that we derived from the magazines, along with a description of what that variable measures.

- Common Name - This codes the generic name of the drug.
- Brand Name - This variable codes the brand name under which the drug is sold.
- Class - Class of drugs that the drug belongs to.
- Manufacturer - Name of the manufacturer.
- Public - A binary variable, indicating whether the drug company is publicly traded.
- Year - Year the magazine was published.
- No. of Side Effects - Number of side effects for the drug listed in the drug guide.
- No. of Drug Interactions - Number of drug interactions with other drugs listed in the drug guide.
- Pill Burden - Number of tablets that need to be taken together.
- Dosage Frequency - Number of times a day the drug dose needs to be taken.
- Food Restrictions - A binary variable indicating whether drug intake has any food restrictions.
- Annual Cost - Average Wholesale Price of drugs, as specified by the manufacturer
- DHHS Preferred - A binary variable, indicating whether the drug has been approved as first-line therapy by the Department of Health and Human Services.
- Doctor's Rating - A categorical variable that encapsulates a doctor's rating of the drug on a scale of 1 to 3.
    1. Doctor mainly uses negative words or phrases to describe the drug.
    2. Doctor says positive things, with some qualifications.
    3. Doctor says mostly positive things.

- Activist's Rating - A categorical variable that encapsulates the activist's rating of the drug on a scale of 1 to 3.
    1. Activist mainly uses negative words or phrases to describe the drug.
    2. Activist says positive things, with some qualifications.
    3. Activist says mostly positive things.
- Doctor - The variable codes the name of the doctor who has reviewed for the current issue of the drug guide.
- Activist - The variable codes the name of the activist who has reviewed for the current issue of the drug guide.

Table C1 presents a summary of all the drugs in the dataset, along with their manufacturer details and year of entry and exit.

Doctor and Activist Reviews

In order to create a ranking system for the reviews, we use the following set of criteria:

- Assign a rating of 1 if mostly negative words or phrases have been used to describe the drug. For example, comments such as "*There is* ***not much to say*** *about ddC anymore.*" ... "***hard to get excited about it****, and these days it's often not prescribed.*" ... "*The role for delavirdine* ***remains unclear****.*", or an activist's comments such as "*ddC has* ***never lived up to its initial promise***" ... "***overall, not a very useful drug***" ... "*Invirase was* ***extraordinarily weak ... not much reason to take it.*** " would be assigned a rank of 1.
- Assign a rating of 2 if the doctor or advocate points out the positive as well as the negative aspects of the drug, but does not give an absolute recommendation of whether the drug is good or bad. For example, comments of the form "*The new soft-gel formulation achieves* ***much better drug levels*** *... but if you are going to use Fortovase as a sole PI,* ***you will have to take a lot of pills.***", and "*It may not be the best bet to include in first-line treatment ...* ***but it remains a solid antiviral.***"
- Assign a rank of 3 to drugs with reviews that mostly use positive words to describe the drug. For example, "*3TC is a* ***potent, convenient and well-tolerated drug***" or, "*3TC, with its* ***minimal side effects, easy dosing schedule and high potency****, may be the* ***most useful of the nucleosides*** " would receive a rank of 3.

Appendix Table C1: Drug Information

	Manufacturer	Year of Introduction	Year of Discontinuation
(a) NRTI			
Retrovir	GlaxoSmithKline	1987	-
Videx	Bristol-Myers Squibb	1997	-
Hivid	Hoffman-LaRoche	1997	2006
Zerit	Bristol-Myers Squibb	1997	-
Epivir	GlaxoSmithKline	1997	-
Combivir	GlaxoSmithKline	1998	-
Ziagen	GlaxoSmithKline	1999	-
Viread	Gilead Sciences	2000	-
Trizivir	GlaxoSmithKline	2001	-
Emtriva	Gilead Sciences	2004	-
Epzicom	GlaxoSmithKline	2004	-
Truvada	Gilead Sciences	2004	-
(b) NNRTI			
Viramune	Boehringer Ingelheim	1997	-
Rescriptor	Agouron Pharmaceuticals	1997	-
Sustiva	Bristol-Myers Squibb	1998	
(c) PI			
Norvir	Abbott Laboratories	1997	-
Crixivan	Merck & Company	1997	-
Viracept	Agouron Pharmaceuticals	1997	-
Saquinavir	Hoffman-LaRoche	1997	-
Agenerase	GlaxoSmithKline	1999	-
Kaletra	Abbott Laboratories	2000	-
Aptivus	Boehringer Ingelheim	2001	-
Reyataz	Bristol-Myers Squibb	2002	-
Lexiva	GlaxoSmithKline	2004	-
Prezista	Tibotec Therapeutics	2004	-

Notes: The table lists details about all drugs in the sample, grouped by drug type. HIV drugs belong to three drug types: Nucleoside Reverse Transcriptase Inhibitor (NRTI), Non-nucleoside Reverse Transcriptase Inhibitor (NNRTI) and Protease Inhibitor (PI). During our period of analysis, only one drug was discontinued.

Appendix D Demand Estimation

We estimate the demand model by GMM, matching the moments predicted by the model to the sample moments. We match two sets of moments to their sample analogue: (1) the market shares for all combinations, and (2) the covariance of the observed product characteristics, $\mathbf{x}$, with the observed individual-level characteristics, $\mathbf{z}$.

For computational ease, we assume that the ϵ_{ijt}'s have an independently and identically distributed extreme value distribution, which leads to the familiar closed-form for the model's choice probabilities conditional on $\mathbf{z}$:

$$\Pr_t(y = j|\mathbf{x}, \mathbf{z}, \boldsymbol{\theta}) = \frac{\exp\left(\delta_{jt} + \sum_{kr} x_{jtk} z_{ir} \beta_{kr}\right)}{1 + \sum_q \exp\left(\delta_{qt} + \sum_{kr} x_{qtk} z_{ir} \beta_{kr}\right)} \tag{8}$$

In order to compute our moments, we first find the value of $\boldsymbol{\delta}$ that makes the market shares from the data, s_{jt}^N, equal to the market shares predicted by the model,[7] $s_{jt}(\boldsymbol{\delta}, \boldsymbol{\beta}; .)$, for each guess at $(\boldsymbol{\beta})$. We then substitute that $\boldsymbol{\delta}(\boldsymbol{\beta}, s_{jt}; .)$ for δ into the model's prediction for the micro moments, making them a function of $(\boldsymbol{\beta}, \boldsymbol{\delta}(\boldsymbol{\beta}, s_{jt}; ,))$. Lastly, we search over $(\boldsymbol{\beta})$ to minimize the distance between model's predictions for the micro moments and the data.

Recall that we also need to address the endogeneity problem of the reviews, since we expect reviews and ξ_{jt} to be correlated. The instruments we use are the average combo characteristics of rival drugs on the market. Let $\boldsymbol{Z} = [Z_1, Z_2]$ be the set of instruments, where Z_1 is the average probability of no ailments for the rival drugs on the market, and Z_2 is the average probability of non-decreasing CD4 count for the rival drugs on the market.

We now describe our estimation algorithm in detail:

1. Let $\mathbf{z}_d$, for $d = 1, \ldots, ns$, be the individual-level characteristics for the ns individuals in visit t from the individual level data from MACS. We then define $\boldsymbol{\delta}^{ns,n}(\boldsymbol{\beta})$ as the value of $\boldsymbol{\delta}$ for a given value of $\boldsymbol{\beta}$ that sets

$$g_1^{ns,N}(\boldsymbol{\theta}) = s_{jt}^N - \frac{1}{ns} \sum_{d=1}^{ns} \Pr_t\left(y = j|\mathbf{x}, \mathbf{z}_d, \boldsymbol{\beta}, \boldsymbol{\delta}^{ns,n}(\boldsymbol{\beta})\right) \tag{9}$$

   equal to $\mathbf{0}$.

2. Calculate the model's prediction for the covariances between the characteristics of the chosen combination and individual-level attributes. In particular, to form the sample

[7] For the logit specification, that is simply equal to the log market share of combo c minus the log of the share of the outside option (taking no drugs).

moment, we interact the average attributes of the individuals that chose combination j at time t with the characteristics of the combination at time t, and then average over all available combinations in that time period. Formally, the second moment is defined as:

$$g_2^{n,ns}(\boldsymbol{\theta}) \approx \frac{1}{n}\sum_j n_j x_{kj}\left\{\frac{\sum_{i_j=1}^{n_j} z_{i_j}}{n_j} - E\left[\mathbf{z}|y=j,\boldsymbol{\beta},\boldsymbol{\delta}^{ns,n}(\boldsymbol{\beta})\right]\right\} \tag{10}$$

where

$$E[\mathbf{z}|y=j,\boldsymbol{\beta},\boldsymbol{\delta}^{ns,n}(\boldsymbol{\beta})] = \frac{(ns)^{-1}\sum_d \mathbf{z}_d \Pr_t(y=j|\mathbf{x},\mathbf{z}_d,\mathbf{v}_d,\boldsymbol{\beta},\boldsymbol{\delta}^{ns,n}(\boldsymbol{\beta}))}{s_{jt}^n}, \tag{11}$$

n_j is the number of individuals taking combination j, $n=\sum_j n_j$ and $\Pr_t(y=j|\mathbf{x},\mathbf{z}_d,\mathbf{v}_d,\boldsymbol{\beta},\boldsymbol{\delta}^{ns,N}(\boldsymbol{\beta}))$ is given by equation (8).

3. Calculate $\bar{\beta}_k$ using the IV GMM formula, and then, using $\boldsymbol{\delta}^{ns,n}(\boldsymbol{\beta})$ from step 1, calculate the error term as

$$\omega_{jt}(\boldsymbol{\theta}) = \boldsymbol{\delta}^{ns,n}(\boldsymbol{\beta}) - \sum_k x_{jtk}\bar{\boldsymbol{\beta}}, \tag{12}$$

to calculate the third moment, which is given by:

$$g_3 = E[\boldsymbol{Z}\omega(\boldsymbol{\theta})] = 0 \tag{13}$$

4. Find the generalized method of moments estimator of $(\boldsymbol{\theta}_{GMM}) = (\boldsymbol{\beta_{GMM}}, \bar{\boldsymbol{\beta}}_{\boldsymbol{GMM}})$ from stacking g_2 and g_3 into a single vector f. In particular, we use a two-step estimation procedure with

$$(\boldsymbol{\beta_{GMM}}, \bar{\boldsymbol{\beta}}_{\boldsymbol{GMM}}) = argmin\left(\frac{1}{n}\sum_{i=1}^n f(\theta)\right)^T \hat{W}\left(\frac{1}{n}\sum_{i=1}^n f(\theta)\right) \tag{14}$$

where $W = E[f(\theta)f(\theta)']$. With the optimal weight matrix, the variance-covariance of the parameters $\boldsymbol{\theta_{GMM}}$ is given by:

$$\hat{V}(\boldsymbol{\theta_{GMM}}) = (\hat{G}^T\hat{W}\hat{G})^{-1} \tag{15}$$

Appendix E Additional Robustness Checks

For additional robustness checks, we begin by pooling the doctor and activist reviews. Table E1 presents the results of the logit with instruments for two ways of pooling the reviews: adding the two reviews for each combination, and taking the maximum of the two reviews for each drug. For both measures, we find that even after controlling for objective qualities, an increase in reviews leads to an increase in the likelihood of choosing the drug combination.

In Table E2, we report results for the specification in which we control for individual and time fixed effects when predicting the probabilities of non-decreasing CD4 count and no ailment for each individual. As before, doctors' and activists' reviews positively predict demand independently; however, in the specification in which we control for both the activists' and doctors' reviews together and control for the combination's objective qualities, we find that a higher review from the doctor decreases the probability of choosing that combination while a higher review by the activist for a combination leads to an increase in the probability of that combination being demanded. The disagreement results are the same, yet in this specification the interaction between the doctors' review and disagreement is not significant.

Lastly, we also check if our mechanism for explaining the negative coefficient on doctor's review is robust to how we define the reviews. Therefore, we use the definition for reviews in which we calculate the percentage of drugs in a combination that have a rating of 3 as our measure of combo-level reviews and run the specification with agreements and disagreements between the two experts. Table E3, column (1) replicates the results for this definition of reviews with which we find that after we control for the activist's review and the objective qualities, the doctor's review negatively affects demand. In column (2), we find that if the experts agree about a combination, then a higher review increases the likelihood of taking that combination. However, in the case of a disagreement, a higher activist's review leads to an increase in the likelihood of taking the combination while a higher doctor's review decreases the likelihood of taking that combination (though the effect is not significant). In column (3), we explore the non-linearities in disagreements and find that if the activist gives a lower review to the combination than the doctor (i.e. a smaller percentage of drugs in the combo receive a rating of 3 from the activist), and the activist's review increases, then the probability of consuming that combination increases.

Appendix Table E1: IV Logit Estimates - Pooling Reviews

	(1)	(2)	(3)	(4)
Total	0.42***	0.55***		
	(0.14)	(0.15)		
Max			0.62***	0.81***
			(0.21)	(0.22)
Objective Qualities	N	Y	N	Y
No. of Individuals	13,472	13,472	13,472	13,472
Combo-time dyads	1,086	1,086	1,086	1,086

Notes: *, **, *** denote p-value < 0.10, 0.05, and 0.01, respectively. Standard errors are given in parentheses. Doctor's review and Activist's review have been pooled together and instrumented using the average probability of no ailment and average probability of non-decreasing CD4 count of rival combos. Columns (1) and (2) show results for the specification in which the two experts' reviews have been pooled by adding up the reviews, while columns (3) and (4) show results for the specification in which the maximum of the two experts' reviews is used as the measure of combo review. The total number of observations used for the estimation is 1,086, which are constructed using data on 13,472 individuals. Objective qualities include the probability of no ailment and probability of non-decreasing CD4 count of the combo.

Appendix Table E2: Objective Qualities with Individual and Time Fixed Effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Doctor's Review	1.64***	1.49***			-0.79	-2.60***	
	(0.38)	(0.34)			(0.77)	(1.00)	
Activist's Review			2.01***	1.08***	2.63***	4.26***	
			(0.36)	(0.21)	(0.71)	(0.93)	
Agree × Review							1.60***
							(0.46)
Disagree × Activist's Review							3.00***
							(0.56)
Disagree × Doctor's Review							-1.10
							(1.01)
Agree							0.49
							(2.47)
Objective Qualities	N	Y	N	Y	N	Y	Y
N	1086	1086	1086	1086	1086	1086	1086

Notes: *, **, *** denote p-value < 0.10, 0.05, and 0.01, respectively. Standard errors are given in parentheses. Objective qualities include the probability of no ailment and the probability of non-decreasing CD4 count of the combo, which are constructed by controlling for individual and time fixed effects when predicting the probabilities using individual-level data from MACS. Doctor's and Activist's review have been instrumented using the average probability of no ailment and average probability of non-decreasing CD4 count of rival combos. The variable 'Agree' is a dummy which is 1 if both experts give the same rating to a combo. The variable 'Disagree' is a dummy which is 1 if each expert gives a different rating to a combo.

Appendix Table E3: Disagreements

	(1)	(2)	(3)
Doctor's Review	-2.41***		
	(0.75)		
Activist's Review	4.69***		
	(0.81)		
Agree × Review		2.07***	2.05***
		(0.56)	(0.61)
Disagree × Activist's Review		2.08***	
		(0.63)	
Disagree × Doctor's Review		-0.40	
		(1.08)	
Agree (% High)		-0.18	-1.09
		(0.47)	(0.70)
Positive Difference × Doctor			2.61
			(1.94)
Negative Difference × Doctor			-3.41*
			(1.92)
Positive Difference × Activist			-0.99
			(1.50)
Negative Difference × Activist			8.28***
			(3.14)
Objective Qualities	Y	Y	Y
No. of Individuals	13,472	13,472	13,472
Combo-time dyads	1086	1086	1086

Notes: *, **, *** denote p-value < 0.10, 0.05, and 0.01, respectively. Standard errors are given in parentheses. Doctor's and Activist's review have been instrumented using the average probability of no ailment and average probability of non-decreasing CD4 count of rival combos. The total number of observations used for the estimation is 1,086, which are constructed using data on 13,472 individuals. The variable 'Agree' is a dummy which is 1 if both experts give the same rating to a combo. The variable 'Disagree' is a dummy which is 1 if each expert gives a different rating to a combo. Finally, the variable 'Positive Difference' is a dummy which is 1 if the doctor's review is lower than the activist's review, while the variable 'Negative Difference' is a dummy which is 1 if the doctor's review is higher than the doctor's review. Objective qualities include the probability of no ailment and probability of non-decreasing CD4 count of the combo.

Appendix F State of the Market

Appendix Table F1: New Drugs

Date of Entry	Name	Market Share at time of entry
April, 1997	Videx	4.40%
April, 1999	Efavirenz	5.84%
April, 1999	Ziagen	0.76%
October, 2000	Kaletra	0.28%
October, 2001	Viread	0.62%
April, 2002	Trizivir	1.67%
October, 2003	Reyataz	0.71%
October, 2003	Emtriva	0.71%
April, 2005	Lexiva	0.56%
April, 2005	Truvada	6.60%
April, 2005	Epzicom	1.88%
October, 2006	Prezista	0.37%
April, 2008	Atripla	19.0%

Notes: The table lists all new drugs that enter the HIV drug market during our period of analysis (1997-2008), along with the market share of those drugs at the time of entry. Market share is calculated at the combo level; i.e. for each of the drugs listed, the market share for drug i is the combined market share of all combinations that include drug i.

Appendix Table F2: Objective Qualities and Reviews of New Entrants and Rivals at Time of Entry

Reviews				
	Doctor		Activist	
	Own	Rival	Own	Rival
Videx	2.42	2.37	2.50	2.42
Efavirenz	2.78	2.28	2.16	2.15
Ziagen	2.92	2.32	2.00	2.16
Kaletra	2.33	1.97	2.67	2.41
Viread	2.83	2.52	2.33	2.38
Trizivir	3.00	2.26	2.17	2.09
Reyataz	2.20	2.36	2.00	2.11
Emtriva	2.17	2.36	2.17	2.11
Lexiva	2.33	2.20	2.33	1.91
Truvada	2.70	2.16	2.63	1.85
Epzicom	2.71	2.17	2.12	1.90
Prezista	2.33	1.91	2.33	1.80
Atripla	2.00	2.04	3.00	2.07
Objective Qualities				
	Non-Dec. CD4		No Ailment	
	Own	Rival	Own	Rival
Videx	0.54	0.57	0.56	0.63
Efavirenz	0.55	0.56	0.65	0.55
Ziagen	0.61	0.56	0.61	0.56
Kaletra	0.55	0.49	0.73	0.55
Viread	0.54	0.54	0.53	0.59
Trizivir	0.54	0.53	0.56	0.61
Reyataz	0.69	0.55	0.71	0.61
Emtriva	0.52	0.56	0.86	0.60
Lexiva	0.76	0.55	0.74	0.63
Truvada	0.62	0.55	0.70	0.62
Epzicom	0.64	0.55	0.61	0.63
Prezista	0.93	0.56	0.90	0.63
Atripla	0.61	0.60	0.81	0.60

Notes: The table reports the average reviews for each expert and objective qualities (probability of non-decreasing CD4 count and probability of no ailment) for the new entrants and their rivals at the time of entry. For any new entrant drug i, the columns labeled 'Own' report the average reviews (or objective quality measure) for all combinations that contain drug i. The columns labeled 'Rival' report the average review (or objective quality measure) for all combos other than the combos that contain drug i.