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ABSTRACT

Economists argue that rich information environments and formal enforcement of contracts are necessary to prevent market failures when information asymmetries exist. We test for the necessity of formal enforcement to overcome the problems of asymmetric information by estimating the value of information in an illegal market with a particularly rich information structure: the online market for male sex work. We assemble a rich dataset from the largest and most comprehensive online male sex worker website to estimate the effect of information on pricing. We show how clients of male sex workers informally police the market in a way that makes signaling credible. Using our institutional knowledge, we also identify the specific signal male sex workers use to communicate quality to clients: face pictures. We find that there is a premium to information and that it is due entirely to face pictures. More importantly, the premium is in the range of premiums to information estimated for legal markets. We also show that the evidence is inconsistent with alternative explanations such as beauty premiums. The findings provide novel evidence on the ability of rich information environments to overcome the problems of asymmetric information without formal enforcement, and show that the value of information in illegal markets is similar to its value in legal markets.

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Formal enforcement is often seen as the cornerstone of contract design. While information can overcome the problems of asymmetric information (Akerlof 1970; Spence 1973), principals are unlikely to engage agents unless the information conveyed is credible and verifiable. While the use of formal institutions such as courts is rare relative to the volume of transactions, the standard argument is that the presence of formal institutions gives contracts their authority. In Schelling's (1960) classic terminology, the power to sue and be sued give parties the ability to make credible, enforceable commitments, a prerequisite to most transactions. Without means of redress, the information that principals and agents share would, *a priori*, have little value.

Numerous studies have documented how informal networks, long-term relationships, and reputations overcome problems of asymmetric information. Indeed, researchers have developed large literatures that look at limited contractibility (Hart 1995; Tirole 1999) and situations where formal enforcement is costly (Greif 1993) to consider the additional mechanisms that must be in place if existing institutions are lacking or unable to mediate disputes. However, the literature has not developed an empirical answer to whether the value of information without formal enforcement approaches its value when formal enforcement is present.

In this paper we ask two questions: Is formal enforcement necessary to overcome the problems of asymmetric information? If not, then what is the value of information without formal enforcement and does it approach its value when formal enforcement is present? Ideally, we would like to analyze an illegal market to answer these questions. If the underlying contract is illegal, it is by definition unenforceable. Similarly, the information that principals and agents convey to one another may not be credible or verifiable. Illegal markets also rule out the possibility that market function or variation in the information environment is due to the presence of formal enforcement. The problem is most illegal markets have coarse information environments. It is therefore challenging to obtain information on prices, quantities, and consumer and producer behavior, making empirical answers to these questions especially difficult. We overcome these problems by analyzing an illegal market with a rich information structure: the online market for male sex work.

We begin with a general description of this seldom-studied market. We then document the ways in which the clients of male sex workers informally police the market: by informing other clients of deceptive sex workers and by reviewing sex workers on independent, client-

owned websites. The informal policing in the market raises the cost of misrepresentation for would-be fraudulent escorts and rewards the truthful self-disclosure of honest escorts, encouraging truthful self-disclosure. We further exploit this institutional knowledge to identify the specific information clients treat as signals of escort quality. Both clients and escorts explicitly mention face pictures in discussions of escort credibility and misrepresentation. Using narrative evidence from qualitative studies, news reports, and online forums, we show that clients look for face pictures in an escort's advertisement as a sign that the escort is trustworthy.

To empirically estimate the value of information in this illegal market, we assemble a unique and rich dataset from the largest male escort website in the United States. We gather information on every male escort on the website: his demographics, hourly price, two measures of reputation, and detailed information about his advertisement. Unlike other studies of information which use scripts to download the information in advertisements, we manually inspect each advertisement and every accompanying picture and record both the quantity and quality of pictures in each advertisement.

We find that this illegal market values information just as much as legal markets where truth-in-advertising and subsequent contracts are rigorously enforced. Interestingly, the price premium we estimate for the total number of pictures in escort advertisements is similar to the premium for pictures estimated by Lewis (2009) for used automobiles on eBay.com; one of the few studies to estimate the value of information in legal online markets. Escorts who post pictures of their faces receive a sizable price premium: twice the premium to pictures in general. Spot prices—specific transaction prices recorded by clients—independently confirm our central estimates. Our main findings are robust to a number of considerations: they hold when looking at escorts with no reputation, when looking at spot prices only, and when controlling for beauty of the male escort.

Our paper makes several contributions. First, we exploit a case where we are able to empirically estimate the value of information in an illegal market. It is intuitive to think that information will be of some value in any market, but the value of information in illegal markets is unknown, and theoretically should be less than in legal markets. While previous empirical work looks at how information technology improves market function (Brown and Goolsbee 2002; Jensen 2007; Lewis 2009; Goyal 2008), we provide the first evidence that an illegal online market is responsive to information just as a legal online market.

Second, we show how this market functions without formal enforcement, describing how clients police the market and identify the specific information consumers take as the signal of quality in this market. Irrespective of the reputational concerns of escorts, we document how client policing can increase the costs of doing business for low-quality escorts. This is in contrast to the traditional focus on aggregate measures of information, reputation and consumer search patterns in online markets (Bajari and Hortacsu 2004; Bakos 2001). In particular, we show that the market does not respond to all types of information: the premium to information in this market is driven almost entirely by face pictures.

Third, our work expands the scope of the existing scholarship in the economics of crime by considering the male side of the sex work market, sex work that is neither street nor brothel-based, and pricing behavior in illegal markets more generally (Browne and Minichiello 1996; Weitzer 2005). It is difficult to test theories of pricing behavior in markets for sex work because price data and survey responses may be incomplete, inaccurate, or biased. We overcome these selection problems by constructing data from the primary source that escorts and clients themselves use: the largest, most comprehensive and geographically diverse website for male escort work in the United States. Our paper also contributes to the large and growing literature which exploits the vast potential of online interactions. While we present the first empirical results from an illegal online market, previous research has used online data from eBay and yahoo! (Lewis 2009; Brown and Morgan 2006; Jin and Kato 2006; Lee and Malmendier 2008), dating websites (Hitsch, Hortacsu, and Ariely, 2009), insurance markets (Brown and Goolsbee 2002) and peer-to-peer lending (Pope and Sydnor 2008; Duarte, Siegel and Young 2009).

Our novel look at the market for male sex work provides a case where the richness of the information environment overcomes some of the problems of asymmetric information. The illegality of the market and the near-impossibility of guaranteed truthful disclosure imply that the market should diverge into a “lemons” market or one where information has dubious value. However, we find that clients informally police the market, punish misrepresentation, and reward credible disclosure. This enables male escorts to credibly signal their quality, and prices in the market respond accordingly.

I. The Online Market for Male Escort Services

Male sex workers are a sizable portion of the sex worker labor force. The market for male escort services is large, with estimated annual revenues in excess of $1 billion in the US, with millions of transactions per year (Steele and Kennedy 2006; Pompeo 2009). Unlike their female counterparts, the majority of male sex workers work independently. There are few intermediaries in the male sex trade in the United States (West 1993; Itiel 1998; Aggleton 1999; Kaye 2003; Friedman 2003; Halkitis 2004; Parsons, Koken and Bimbi 2007). As such, male sex workers are independent owner-operators whose fees are not shared with others and who compete with one another for clients. This is in stark contrast to female sex work, where fees for services are usually set by and shared with pimps or madams, who act as intermediaries. Despite these interesting market features, this market is seldom studied by economists.[1]

Changes in technology have modified or eliminated older forms of male escort work. Before the internet, escorts would place ads in local gay-orientated newspapers for clients, who would contact them and arrange appointments. The male sex work market now largely takes place online (Steele and Kennedy 2006; Pompeo 2009). Although female sex work has recently begun to appear online in internet forums such as Craigslist.com (Murphy and Venkatesh 2006; Lambert 2007), male escorts have had access to large and profitable websites devoted to the male sex trade for well over ten years (Friedman 2003; Parsons, Koken and Bimbi 2007; Halkitis 2004). Unlike escort agencies and other online transactions between two parties, such as eBay.com, the websites themselves do not derive any profits from the transactions that escorts make with clients, they simply allow escorts to post their advertisements and contact information. The websites charge a set fee to escorts for hosting an advertisement and act as a clearinghouse where escorts advertise their services and clients choose between escorts. Consequently, these sites do not screen clients for escorts or vice versa, make no claims or guarantees about the quality of the escorts, and offer no recourse to clients in cases of poor escort performance or fraud.

[1] There are few works in the economics literature on male sex work. Theoretical approaches which focus on female sex workers have been offered by Edlund and Korn (2002) and Giusta, Tommaso and Strom (2009), and some theoretical predictions for male sex workers have been tested empirically (Arunachalam and Shah 2008a; Logan 2009; Edlund, Engelberg, and Parsons 2009). The literature on male sex work in the historical, sociological, and public health literatures is many times larger and includes Boyer (1989), Dorias (2005), Ginsberg (1976), Hoffman (1972), Kaye (2003), Luckenbill (1986), McNamara (1994), Pettiway (1996), and Salamon (1989). We avoid the use of the term "gay" to describe this market since many participants do not self-identify as gay men. See Scott (2003) for more on the semiotics of male prostitution.

The ability of male escorts to price directly without intermediaries and the large number of escorts create a market setting similar to competitive market assumptions where we expect markets to function well. Since this market is an illegal market, however, there is potential for escorts to mislead clients and engage in fraud. In particular, an escort's ability to post unreliable information should lead to adverse selection in the market. While escort claims are verifiable *ex post*, there are no formal institutional penalties for *ex ante* misrepresentation. Similarly, it is unclear how much weight a reputation in an illegal online market carries. Without formal enforcement and with the stakes particularly high (especially for men who are married and/or not generally assumed to partake in homosexual behavior), it is unclear if a rich information environment alone can prevent adverse selection. Previous research based on newspaper advertisements for male escorts found no differences in pricing due to information (Cameron, Collins, and Thew 1999). The open question is whether the rich information environment offered by the internet increases opportunities for escorts to disclose positive information about themselves, and whether the pricing of male escort services is related to this information.

The market for escort services is one of the few instances where illegal behavior is openly advertised. While this is extremely rare for illegal markets, there are reasons why escorts publicly announce their prices for services. First, it minimizes the legal risks of sex work. In most police stings for solicitation, the sex worker and the client must agree to both a price and sexual conduct. The illegal contract must specify, verbally or otherwise, the terms of the transaction. By posting prices and sexual behaviors online, clients and escorts do not discuss payment or prices. In fact, escorts are wary of clients who discuss prices, as this is taken as evidence that they could be police officers (Friedman 2003). As described below, how-to guides for clients and escorts advise both to keep contractual discussions to a minimum:

> Understand, though, that they might not be able to fully describe over the phone what they do because they don't want to get busted…Most escorts will not discuss specific sexual acts for sale. Such is illegal and their services are for time and companionship only. Money is exchanged for time only, the decision to have sex would be a mutual and consensual decision two adults make. Upon meeting the escort, you may be asked certain questions about any possible affiliation with law enforcement (From Rentboy.com "First Time Hiring an Escort?" Accessed April 28, 2008).

Second, escorts compete with one another on these websites. While clients calling a traditional escort agency can be steered to a particular sex worker, clients of male escorts can freely choose between hundreds of options. Qualitative interviews with escorts have revealed

that escorts post prices as a way to ensure that clients who contact them can afford their services.[2] Third, by setting their prices publicly, escorts avoid the time spent haggling with clients over prices, a staple of street prostitution (West 1993; Gertler, Shah, and Bertozzi 2005). Escorts assume that any client contacting them knows their price and will pay the posted rate for services, just as any other business owner would expect customers to pay the advertised rate. Despite this publicly posted information about illegal activity, police raids of male escorts are surprisingly rare.

There are numerous sources that describe the generic male escort encounter (Itiel 1998; Hart 1998). Clients contact escorts directly and arrange for appointments either at the home of the escort (an "incall"), or at the home/hotel of the client (an "outcall"). In the most basic form of an outcall, a client will search escort advertisements and choose an escort. If an appointment is immediately desired, such as the same day, the client will usually phone the escort. Appointments for future dates may be arranged by email, although some escorts prefer to make all appointments by phone. Escorts generally encourage clients to describe the length of the desired appointment and to note any circumstances the escort should be aware of (e.g., manner of dress required by client, clients who may be disabled, etc.). Escort and client then discuss the time and location of the appointment. Once the escort arrives at the location, he meets the client and the two may have a brief discussion to reaffirm the earlier phone conversation. Money is almost never discussed face-to-face. Money is usually exchanged after the appointment ends, but clients are encouraged to place the money in plain view, such as on a dresser or desk, either before the escort arrives or at the beginning of the appointment.

Itiel (1998) notes that male escorts and clients have less leeway to informally penalize misrepresentation than street sex workers and their clients. While street sex workers and clients can freely disengage from a transaction for whatever reason by simply walking away, the clandestine nature of an "incall" or "outcall" make it difficult for either party to escape penalty free if there has been misrepresentation. For example, once the escort has arrived at the hotel door or home of a client, it may be difficult to induce him to leave without payment. Also, once the misrepresentation is revealed, the client (and potentially the escort) is already exposed: the escort knows the client's location, some form of contact information, and is open to blackmail and harassment depending on his circumstances. Moreover, clients cannot appeal to an

[2] This roundtable interview with escorts was accessed at http://www.rentboy.com on April 28, 2008.

intermediary's reputation to minimize their exposure. The very nature of the male sex market alters the usual interpretation of the risks involved in sex work. While male escorts are seen as a "safer bet" than male street sex workers (Sadownick 1996; Itiel 1998; Friedman 2003; Dorias 2005), the overall structure in the market is one in which the client is at risk of harm.[3]

Unlike female sex workers, who are at greater risk of being violated by clients, male sex workers are prone to violate their clients. Clients are at risk in a number of ways, and the harm from hiring an unsavory escort can have serious consequences. First, escorts may simply rob clients; a traditional scam is to request payment up front and then feign an excuse to leave, never to return. Another common ploy is to steal the client's wallet in the course of an appointment. In online forums, by far the most frequent complaint from clients are escorts who take payment but do not deliver services.

Second, escorts may blackmail or expose their client's sexual behaviors. As noted earlier, clients and escorts usually communicate by way of telephone or email before the appointment. Most escorts refuse calls from clients with "blocked" phone numbers, which exposes clients to risk of blackmail because escorts can trace the client's phone number. Escorts could threaten to "out" a client, inform his family of his sexual practices, threaten to contact his employer, or even threaten to contact legal authorities since the client has solicited prostitution. The case of Ted Haggard (the former President of the National Association of Evangelicals who became embroiled in a sex scandal involving a male escort in 2006) is one where the escort kept voicemail messages from the client and later released them to the press. The additional social stigma attached to being exposed as a homosexual can be career-ending.[4]

Finally, since escorts are relatively young and virile men, physical violence is not uncommon. While escorts usually have an informant they keep abreast of the location and contact information for every appointment in case of an emergency, clients most likely do not let others know of their whereabouts, leaving them particularly vulnerable (Itiel 1998; Friedman

[3] As a linguistic (perhaps semiotic) sign of the risk borne by the client, male escorts are also known as "hustlers," a term also used for drug dealers, hoodlums and thieves (Scott 2003).

[4] Several prominent political careers have been damaged by allegations of involvement with male prostitutes (Steele and Kennedy 2006). Rep. Barney Frank (D-MA) was reprimanded by the House of Representatives in 1990 when it was revealed that an escort acquaintance of his was operating out of his home. In 2003, Utah state representative Brent Parker (R) resigned when accused of soliciting an undercover police officer and in 2006 Tom Malin lost a Democratic primary bid for the Texas state legislature when it was revealed that he had formerly been an escort. Occasionally the consequences are tragic—Republican lobbyist Craig Spence committed suicide in 1989 when he was accused of taking male sex workers on unauthorized tours of the White House.

2003). In online forums, clients themselves mention instances where escorts either attacked them or threatened bodily harm.[5] Clients describe being punched, kicked, threatened or beaten with knives, guns, and other deadly weapons. Moreover, these crimes are likely to be unreported since the client would be forced to reveal how he came to know the escort in question.

Unlike the markets for other services, where clients may not choose to pursue legal redress for small matters, clients of male escorts do not have the option of seeking redress for any grievances regardless of their size. While one may be compensated in-kind for poor service at a restaurant, for example, we found no evidence of similar arrangements in the male escort market, even for small grievances. This, in turn, increases the incentive for clients to police the market, although we note that there are limits to how effectively an illegal market can be policed. In the next section, we show how clients police the market to minimize the probability that they will hire an unscrupulous escort.

II. Evidence from the Demand Side of the Male Escort Market

a. Informal Enforcement in the Male Escort Market

Why would clients be driven to police the market for male escort services? Theoretically, in order for signals or disclosure to be informative, there must be a reasonable basis for the receiver to trust the accuracy of the signal (Spence 2002, Lewis 2009). Most models of disclosure assume that disclosure is truthful and that misrepresentation does not exist (Jovanovic 1982). The key issue is whether to disclose truthful information. This issue is pertinent for firms that would expose themselves to significant liability if they knowingly mislead consumers. In an illegal market, however, such guarantees cannot be made and informal policing may be the only option. A large part of the answer is that clients have little choice if they would like to minimize the probability of meeting a deceptive escort. Since the websites that host advertisements for male escorts derive no income from clients and maximize profits by hosting the largest number of advertisements, they pay little attention to clients' complaints about deceptive escorts who advertise on the websites. Interestingly, one client framed the situation in the classic used-car reference familiar to most economists:

[5] One client noted "The time an escort grabbed me by the throat and slammed me up against wall rifling my pockets for my wallet. Then punched me a couple of times for not bringing my ATM and credit card." [Unless otherwise noted, all further quotes from forums come from the online forum hosted by http://mc.daddysreviews.com.]

> That site is a advertising site, not an agency. If the used car you buy turns out to be a lemon, do you take it up with the paper that ran the classified ad for it? Could you imagine what managing that he said/ he said would be like?

Just as the purchaser of a car advertised in the newspaper does not hold the newspaper responsible for the car being a lemon, clients of escorts cannot hold the advertiser responsible for hosting advertisements of escorts who are less than truthful. [6]

Clients police escorts in two ways: through posts to independent client-owned forums and through detailed reviews of escort services on the escort websites, which are linked to the respective escort's specific advertisement. The primary feature of client-based forums is information gathering by potential clients. Clients ask other clients for leads to good escorts in an area that they are unfamiliar with, and clients post unsolicited information about escorts as well.[7] This information is automatically available to all interested users.[8] These forums can be used to highlight a number of dangers regarding escorts. Escorts can create deceptive advertisements on escort websites, use multiple aliases, and even steal from their clients. The forum acts to ensure that these rogue escorts are exposed to clients.[9]

Additionally, clients can also write reviews of escort services on escort websites, such as our data source. These reviews allow for free-form opinions of the escort's services. They usually contain a great deal of information about the escort and his behavior during that particular appointment—clients give information on how the appointment was made, specific information regarding the escort during the appointment, such as escort hygiene, physical appearance, conversational ability, the escort's manner of dress, sexual activities provided, and the price charged.[10] While the escort websites do give escorts the option of allowing themselves to be reviewed by clients (nearly 95% in our data allow it), escorts have no control over the reviews and all reviews are posted if the escort allows reviews. This all-or-nothing nature of

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[6] The most popular client based site has been in existence since the early 1990s.

[7] Not all exchanges are negative. Indeed, many clients give glowing recommendations to escorts.

[8] The following exchange is typical. "CLIENT #1: I've been drooling over an ad in Chicago who had been listed on XXX as "XXX". Anybody know more? CLIENT#2 (Response): I can add some information on this guy. I actually can't remember the name he used, but I do remember the photos. He quoted me $300 and listed himself as a dominate top. He showed up at my hotel on time and when I opened the door I didn't think his face looked the same as the face pic on the ad. I don't think the other pics on his current ad are him though. So in a nutshell, buyer beware."

[9] The following is an example of such a warning. "[Link to escort advertisement] I hope this link works and I want to let everyone to know to STAY AWAY!!!! He stole $500 from my house and is in partnership with John, Johnny, Joe … [he] also goes by Jake, Michael and many other names…."

[10] Some clients also participate in client-based online reviews that are not linked to escorts' websites. These reviews serve the same purpose as the reviews which are linked to escort websites.

reviews is a key advantage of these reputation measures in that escorts have no control over their reviews: all reviews for the escort are retained on the website, not a selected sample posted or chosen by the escort. We describe the features of client reviews on escort advertisement websites in more detail in the data description below.

The vigorous policing by clients allows for the stock of information to be large: clients who would never meet exchange information about escorts. While the cost per client to share information is relatively low, the returns to the accumulated knowledge are large. These policing measures also allow disclosure to be credible. They raise the cost of deception for the untrustworthy escort, creating a wedge where the honest escort can credibly signal and receive a premium for doing so. A deceptive escort would need to create a totally new advertisement with new pictures and new contact information to continue to operate in the market once he is discovered. These new identities are not costless. This means the cost of being a deceptive escort is greater than that of being a truthful escort. This cost differential is a necessary condition for signaling to be informative.

b. Identifying the Signal

Due to the inherent dangers in male sex work and the unique situation where male sex workers have to provide information to their clients with regard to their honesty and safety, the information flow is from escorts to clients. Clients choose escorts from many available options, and clients reveal that they choose escorts based on both physical characteristics and cues as to who will not pose a threat to their security and privacy. High quality escorts will show up on time, match their advertised description, provide the agreed upon services at the advertised price, be discreet, and generally act in a manner respectful of the client's privacy and safety.

What information do clients consider when they hire a male escort? We use the same client-based forums that serve as policing to identify the types of information that escorts and clients take as important in male escort advertisements. Clients reveal that they pay particular attention to the presence of face pictures (ideally multiple face pictures) in an escort's advertisement as a signal of truthfulness.

> I've been tempted [to hire an escort with no face pictures] but have always ended up feeling let down by anyone without a face-shot so I've stayed away.

> As far as pics that are probably not real, same deal, do not hire. No one has just a professional modeling pic or two and no other pics. They need to have more than one face pic in their ads.

Escorts agree that face pictures transmit information about quality in their advice to clients and in their advice to other escorts. Even in their advertisements, escorts note that face pictures are what clients take into account.

> Don't get fooled by escorts using headless picture, they are often fake! Choose the certified one! A real man!

Indeed, escorts who do not have face pictures in their advertisements apologize for the lack of them.

> Goodlooking all-American…clean-cut type…Sorry no face pic but you won't be disappointed!!

All of the qualitative evidence suggests that escorts and clients treat face pictures as particularly valuable information and a signal that the escort is unlikely to misrepresent himself.

There are several reasons why face pictures would be a signal of truthfulness or quality. Face pictures give a key measure of immediate representativeness: upon meeting the escort the client would know whether the escort was "as advertised." This would allow a client to minimize any potential losses since misrepresentation would be obvious. Escorts who do show their face convey that they have less to hide. They are willing to be publicly identified, making it less likely they will violate the client or expose him to blackmail or harassment since they could be readily recognized by third parties. Posting a face picture is similar to posting a bond— it decreases the probability that an escort would misrepresent himself, and therefore act as advertisements for quality (Laband 1986; Milgrom and Roberts 1986; Pope and Sydnor 2008; Duarte, Siegel and Young 2009). A deceptive escort, once discovered, cannot costlessly reinvent himself. Also, clients can use face pictures as a search characteristic when looking for male escort services. Escorts who do not show their faces may not want to be identified because of their occupation and/or because they are not high quality. Not signaling is one way of ensuring anonymity, which makes it easier to deceive clients.

III. Conceptual and Empirical Framework

a. A Simple Signaling Model

To bring the description presented earlier into clearer focus we describe a simple signaling model in the spirit of Spence (1973, 2002). To increase the exposition, we use the simple two-type model where escorts are of two quality types and attempt to signal to a potential client, but we note below how our model is consistent with a disclosure model. We construct a

simple one-shot model, but our central result holds in repeated signaling games since signaling and reputation act as substitutes for one another in repeated games (Kaya 2009).[11]

To begin, we assume that escorts are either high or low quality escorts, which we note as θ_H and θ_L, respectively. In the population of escorts, some fraction λ are type *H*, and (1-λ) are type *L*. The cost (*c*) of signaling (*s*) is a function of the type of escort and the signal itself $c(s,\theta)$, which we assume has the traditional properties of a signal: the high quality escort can signal more easily than the low quality, and the single crossing property holds, such that $c_s(s,\theta)>0$, $c_{ss}(s,\theta)>0$, $c_\theta(s,\theta)<0$, and $c_{s\theta}(s,\theta)<0$.[12] Escorts can either signal/disclose ($s>0$) or not signal/disclose ($s=0$). As noted earlier, if one signals and is exposed as a low type he must incur the costs of creating an entirely new identity, which is substantial in both time and money. The high probability of being detected increases the cost of signaling for the low type, justifying the assumption.

While policing raises the probability of detection, policing in the market will not lead every high quality escort to show his face, nor will it lead every low quality escort to hide his. Disclosure is not always truthful in this market, as the client forums attest. There are several reasons why a high quality escort may choose not to show his face in escort advertisements. Since sex work is illegal, disclosure could draw unwanted attention to the escort. If an escort plans to escort for only a certain length of time, or if escorting is not his full-time occupation, he may not want long-lived, easily-identifiable evidence of his previous occupation to hound him. News stories abound of men who had been sex workers, and the discovery of their previous life of prostitution had serious consequences (Steele and Kennedy 2006). Exposure as a male sex worker could bring into question one's sexual orientation, which could bring about further negative consequences. To capture this fact, we assume that the cost function contains a random element ε that is unrelated to type

$$c(s,\theta,\varepsilon)=c(s,\theta)+\varepsilon \text{ where } \varepsilon \sim N(0,\sigma^2) \quad (1)$$

This new term in the cost function still allows all of the conditions to hold as before, but now in any perfect Bayesian equilibrium the client would have to take into account that a certain

[11] Kaya (2009) shows that the degree of substitutability will depend on the agent's desire for a smooth payoff stream. We test for substitution in section VI.C.

[12] We stress here that the costs of signaling may be both material and/or psychic. For example, if escorts have negative attitudes towards gays or would be subjecting themselves to negative outcomes if the public knew they participate in gay sex, it would be more costly (psychically) for them to signal to clients.

fraction $(1-\alpha)$ of signalers would be low quality, and a certain fraction of non-signalers $(1-\beta)$ would be high quality. The variance of the random term will cause the client to revise his expectations of α and β ($\partial\alpha/\partial\sigma^2 < 0$ and $\partial\beta/\partial\sigma^2 < 0$). Another way of modeling this feature would be to have two dichotomous nodes: one for escort type as either high/low quality ($q \in \{H, L\}$) and another for disclosure/signaling ($s \in \{Y, N\}$), which can be yes/no. The key point is that in either model disclosure/signaling does not fully reveal type, and the model hinges on how well correlated disclosure/signaling and quality are believed to be by the client.

We assume that escort utility is a function of the earnings they receive from escorting (*w*) less the cost of signaling $u(w, s \mid \theta) = w - c(s, \theta)$.[13] In any pure strategy perfect Bayesian equilibrium, the client must assign a wage that is equal to the escort's expected productivity, and the wage of the high quality escort is greater than the wage of the low quality escort, $w(\theta_H) > w(\theta_L)$. As described earlier, if a client observes the signal (the escort discloses), then with probability α he will expect the worker to be of type *H*. If no signal is observed (the escort does not disclose), the client will expect the worker to be of type *H* with probability (1−β). This gives the belief structure for the client

(2) $$\mu(\theta \mid s > 0) = \alpha\theta_H + (1-\alpha)\theta_L; \quad \mu(\theta \mid s = 0) = \beta\theta_L + (1-\beta)\theta_H.$$

The wages offered by the client are therefore a function of the signal

(3) $$w \mid s > 0 \rightarrow \alpha w(\theta_H) + (1-\alpha) w(\theta_L); \quad w \mid s = 0 \rightarrow \beta w(\theta_L) + (1-\beta) w(\theta_H).$$

This wage offer is consistent with the escort's strategy when two conditions hold. First, for the high type, the utility of disclosure/signaling must exceed the wage offered when no signal is observed.

(4) $$w \mid s > 0, \theta_H \rightarrow [\alpha w(\theta_H) + (1-\alpha) w(\theta_L)] - c(s > 0, \theta_H, \varepsilon) > \beta w(\theta_L) + (1-\beta) w(\theta_H)$$

If this does not hold, then high types would have no incentive to disclose/signal. Second, for low types, the utility of signaling must be less than the wage offered when not signaling,

(5) $$w \mid s > 0, \theta_L \rightarrow [\alpha w(\theta_H) + (1-\alpha) w(\theta_L)] - c(s > 0, \theta_L, \varepsilon) < \beta w(\theta_L) + (1-\beta) w(\theta_H)$$

or else the low type would always signal.

In the pooled equilibrium the signal does not lead to wage separation—all escorts would be paid the same. In the separating equilibrium, there is separation between types where the

[13] Since we deal only with men who are escorts, and are not concerned with selection into male escort work, we normalize the standard reservation wage to zero.

signalers receive a higher wage than non-signalers. In this case the signal is informative as it leads clients to believe that the escort is more likely to be a high type. In an illegal market such as this one, it is difficult to specify which equilibrium would hold. Furthermore, it is difficult to assume the relative number of informed and uninformed market participants, which is necessary to characterize the equilibrium that would result since quality is unknown (Chan and Leland 1982; Cooper and Ross 1984).[14] Indeed, most signaling models implicitly assume that some type of formal enforcement or institution guarantees truthful disclosure.[15]

There are several reasons we might expect a pooled equilibrium. First, the degree of uncertainty could be large, which can cause clients to react weakly to signals, if at all. Second, the cost differential for signaling by type may be particularly small in this market. Although clients act to police the market, this may not result in a substantial cost differential such that (5) may not bind. This revises estimates of α downward and reduces the value of signaling in the market for the high type. As we discussed earlier, it is possible that escorts themselves create deceptive reputations, making it difficult for any client to be truly informed as to any escort's quality, even with client policing. Any client without direct experience with a given escort would be fundamentally uninformed (or less than fully informed) as to the escort's true quality since deception is a distinct possibility. Since the cost of signaling for the low type may not be much higher than that of the high type, it is difficult to argue that other players would properly infer that an action is equilibrium dominated or not (Cho and Kreps 1987). By the same token, it is not clear if the least cost separating equilibrium is the one that we would observe if there is separation, nor is it clear that reputation would solve the problem since those describing the reputation of the escort may have ulterior motives. For example, positive reviews may be left by the escort or his associates, negative reviews by competitors.

We therefore test for whether information in this market leads to separation. If there is separation, then the market overcomes (at least partially) the problem of asymmetric information without formal enforcement. One might expect, however, that in any market with some form of communication that information would be of some value. While theoretically the question is

[14] A further complication is that since every service on this market is inherently unique, it is difficult to define an uninformed consumer.

[15] For example, consider the simplest version of the signaling model in Spence (1973), where workers obtain otherwise useless education to signal their ability to employers. If schools could not certify that an agent had actually obtained the years of schooling she claimed (for example, by printing fraudulent degrees or transcripts), anyone could act as if they had the highest level of education possible. Such fraud would obviously decrease the value of the signal.

whether or not the signal has value, an additional empirical question is how much value the signal has relative to the value of a signal in a market where formal enforcement is present—whether legal and illegal markets value information to the same degree.

b. Empirical Strategy

The key empirical question is the value of the signal. Our task is to test if the average price of male sex workers who use face pictures, the signal we identified earlier, is greater than the average price of those that do not, holding other observables (x) constant

$$E(w \mid x, s > 0) > E(w \mid x, s = 0) \tag{6}$$

Following empirical studies of information in markets, we use a hedonic regression of the escort's price on the information he provides in his advertisement. We take the usual interpretation that the coefficients reflect a consumer's willingness to pay for each characteristic, and therefore reflect the characteristic's value. While there have been criticisms of this interpretation due to restrictive assumptions, Bajari and Benkard (2005) show the interpretation holds and that the price function is identified under very general conditions that apply to our case.[16] If the market separates based on the signal we identified, then face pictures will have value in terms of escort prices. We therefore regress the escort's hourly price on the signal in the advertisements (*Signal*), reputation and reviews (R), personal characteristics (Z), and identifiers for location/market (X).[17]

$$\ln(P_i) = \varphi + \gamma Signal_i + \phi R_i + \delta Z_i + \lambda X_i + \varepsilon_i \tag{7}$$

In contrast to other studies that analyze the total amount of information in the market, we disaggregate the information in order to estimate the value of particular types of information. We estimate the value of pictures in general and specific types of pictures, namely face pictures. Based on the institutional analysis presented earlier, we hypothesize that face pictures are the key type of information that leads to separation in the market for male sex work. If the market takes face pictures as a signal of escort quality, we would expect γ to be positive. If not, then

[16] Bajari and Benkard show that the interpretation is still valid even if there is imperfect competition or a small number of products, and prove that even with unobserved product characteristics the price function is identified.

[17] We use the hourly outcall price as the dependent variable. Results are unchanged when using the incall price (see the appendix). Individual characteristics include race, weight, height, age, and sexual behaviors advertised. See the data appendix for complete variable definitions. We control for the escort's location not only because price may vary with geography, but specific locations may have more or fewer competitors. We use state fixed effects in the regressions, and cluster the errors at the state level. Results were similar (but standard errors smaller) when we included city-specific effects and/or clustered the standard errors at the city level.

participants do not respond to the signal either because it is not believed or because it is a noisy signal of quality.

IV. Data from the Online Male Escort Market

To measure the role of information in the market for male sex work, we assemble a unique data set of approximately 2,000 men from the largest and most comprehensive website for male sex workers in the United States.[18] Since escorts post their prices publicly, we can estimate the role of information directly as opposed to inferring prices (Moffatt and Peters 2004). Relative to other data sources, our online source has several advantages. First, this data allows us to collect information on escorts' attributes, prices and information without regard to the selection problems that we would encounter in a survey of escorts. We include every unique advertisement on the website in our data. Our data contains everything a client sees when choosing an escort from this site. Second, escorts have one account on our website and may list themselves in multiple cities that they serve. With other online outlets for male sex work, escorts have unique advertisements in each city, and therefore it is impossible to know the number of escorts that work from a particular base with certainty. Third, the escort characteristics that we use are entered by escorts from dropdown menus; this is particularly advantageous for features one would like to control for in pricing models, such as body type or hair color, where free-form responses may be difficult to evaluate consistently or are missing altogether. Fourth, the website is free for viewing by all: there is no charge or account required to view any advertisements, photos, or reviews of escorts. Lastly, escorts are reviewed on the site in two different ways, and both types of reviews are available to all visitors.

Beyond its geographic coverage, our source also includes a rich information environment in which escorts can potentially signal to clients. Figure I shows a diagram of an escort advertisement. Escorts list their age, height, weight, race, hair color, eye color, body type, and body-hair type. They give clients contact information and also their preferred mode of contact (phone or e-mail), their availability to travel, and their prices and availability for incalls and outcalls. In what follows, we take the hourly outcall price as the price of escort services, although our results are robust to using the incall price. Escorts also provide clients with the

[18] See the data appendix for further details of data construction and a comparison of our data source to its two largest competitors.

range of services they offer in addition to escort work such as modeling, erotic massage, and stripping. Escorts have a simple table where they can let clients know their weekly availability. There is also the actual text of the advertisement itself, which allows escorts to write about their services and quality. The largest piece of the advertisement is the escort's pictures, which are uploaded by the escort. These pictures may be of any feature of the escort that he chooses, and may be clothed or nude.[19]

We collect information on an escort's attributes as listed in his advertisement, using all of the information that is available to clients. Our data source is unique in that it provides two types of reputation measures, survey reviews (similar to feedback on eBay.com) and detailed reviews of escorts. The survey reviews ask the reviewer five questions about the escort (four of which are "Yes/No") and a rating on a four-star scale.[20] The detailed reviews, which we term "text reviews," are the detailed free-form client reviews described earlier. In addition to providing a review of escort services, clients also give the date of their encounter with the escort, the type of appointment made (incall, outcall, or an extended appointment such as an evening or weekend), and the price paid, which we term the "spot price," as it reflects the price paid in a specific transaction. As we noted earlier, a key advantage of these reputation measures is that escorts have no control over their reviews—all reviews of both types are retained if the escort allows reviews, not a selected sample posted or chosen by the escort.

Since we are interested in both the quantity and quality of pictures, we recorded not only the number of pictures, but also the quality of pictures. In particular, we look at three categories of pictures—pictures that show an escort's face in a distinguishable way (which may or may not include nudity), pictures that show a nude body only (either from the front or the back, but with no face shown), and pictures that show neither nudity nor an escort's face (e.g., pictures of torsos, biceps, legs, feet, etc.). We treat the third category as our omitted category in the empirical specification. Since these determinations must be made on sight, the picture information variables were all entered manually.

Table I shows the summary statistics for the escorts in our data. On average, escorts charge more than $200 an hour. This is consistent with other estimates of escort services, which

[19] While nudity is allowed, escorts may not post pictures that display sex acts and may not display pictures which include persons other than the escort. Uploaded pictures are placed in an online holding tank until cleared by the website's management. Every advertisement must be accompanied by at least one picture.

[20] The questions are: Did he show up? Did he match his description? Did he provide desired services? Would you recommend him? How hot was he?

are close to the $200 an hour range (Steele and Kennedy 2006; Pompeo 2009). Escorts are reasonably fit and relatively young; on average they are 28 years old, 5'10" tall and weigh around 165 pounds. Escorts are racially diverse; while more than half of all escorts are white, more than a fifth are black and more than a tenth are Hispanic. In terms of information, escorts post an average of six pictures in their advertisements, have three survey reviews, and one-in-three escorts has a text review. Two-thirds of escorts post at least one face picture and, on average, escorts post three pictures containing their face and two containing their nude body with no face shown. There are some differences when looking at the summary statistics for escorts by whether they post face pictures. For example, the average escort who shows pictures of his face posts nearly seven pictures, four of which are of his face. The average escort who does not show pictures of his face posts five pictures, three of which are of his nude body. Escorts who post face pictures charge approximately $230 an hour, while escorts who do not post face picture charge approximately $190 an hour. In the next section, we check to see if these differences in prices hold after controlling for various individual, reputation, and geographic differences.

V. Face Value

Table II reports OLS regression results from the basic specification, where we regress the escort's log hourly price on the number of pictures and a large number of controls such as escort characteristics and location. We consider this to be our naïve specification since it treats all information equally and considers only the quantity of the information. Column 1 shows that the number of pictures in an escort's advertisement is strongly related to the escort's price, controlling for individual characteristics and market location. Each additional picture increases an escort's price by 1.7%, and is significant at the 0.01 level. A one standard deviation in the number of pictures increases the escort's price by 0.16 of a standard deviation, a sizable effect. The magnitude of the premium for pictures is close to the premium noted by Lewis (2009) for used cars on eBay.com (1.66% and 1.82%), one of the few estimates for the value of information in legal markets. Surprisingly, we find that information has value in this illegal market just as it does in legal markets where enforcement is formal and thorough.[21]

In column 2 we add the more coarse measure of reputation—survey reviews—and find that the number of survey reviews does not vary significantly with escort prices. In column 3 we

[21] Lewis (2009) describes the lengths taken by eBay to eliminate fraud in their used car sales, including prosecution.

add the more detailed and informative measure of reputation: free-form text reviews. Text reviews are strongly and positively related to prices, a one standard deviation in the number of text reviews increases escort prices by .3 standard deviations. Consistent with other results in the literature, reputation affects prices in the male escort market. In fact, text reviews affect the price more than the total number of pictures.

In column 4 of Table II we add a dichotomous measure for the presence of face pictures in an advertisement. The institutional evidence we presented earlier suggests that face pictures are the key measure of truthfulness in the market, and we therefore expect their presence to be positively related to escort prices if they are a signal of quality. The effect of face pictures on prices is large. Escorts who post pictures of their faces have prices that are more than 20% higher than those that do not, even after controlling for both measures of reputation and a host of individual escort and market characteristics.[22] Additionally, including a measure of whether face pictures are present significantly reduces the relationship between total pictures and the escort's price—the coefficient on number of pictures is reduced by more than 50% once the indicator for face pictures is included. In column 5 we include a dichotomous measure of having a nude body picture with no face shown. The effect of having nude, headless photos actually reduces the price by more than 5%.

We can use the results from Table II to bound the cost of signaling for each type. Recall from the model presented earlier that for both high and low types, the utility of signaling must exceed the wage offered when no signal is observed (equations 4 and 5). Rearranging terms in equations (4) and (5) and simplifying the expression yields

(8) $$\left(w \mid s>0\right)-\left(w \mid s=0\right)>c\left(s>0,\theta_H,\varepsilon\right)$$

(9) $$\left(w \mid s>0\right)-\left(w \mid s=0\right)<c\left(s>0,\theta_L,\varepsilon\right)$$

We know the value of the difference between the signal and no signal, $\left(w \mid s>0\right)-\left(w \mid s=0\right)$, is a 20% difference in hourly price as shown in Table II. Taking $200 as the average hourly price of escort services in our data, the difference is roughly $40. This implies that $40 is greater than the cost of signaling for the high type and lower than the cost of signaling for the low type in this market. If an escort sees an average of twenty clients per month, the difference would amount to roughly $10,000 per year in additional earnings for the signalers.

[22] Since the specification is semi logarithmic, the percentage change is approximated by exp(γ)-1 (Halvorsen and Palmquist 1980).

While Table II examines the role of information at the extensive margin, we would like to know if intensive measures of information are consistent with the extensive margin results. Table III presents the results from our preferred specifications, in which we use the number of face and body pictures in the specification. We investigate the premium to each additional face picture and body picture to see how much of the total premium to pictures can be attributed to each type.

In Panel A of Table III we use the number of face and body-only pictures as our measures of information. Column 1 shows that the premium to each face picture is large—each additional face picture increases the price charged by an escort by roughly 3%, nearly twice the premium of total pictures reported in Table II. Put another way, a one standard deviation in the number of face pictures increases escort prices by 0.3 of a standard deviation and is significant at the 0.01 level. In column 2 of Panel A we add body-only pictures and find that they are not significantly related to prices. In columns 3 and 4 we add the two measures of reputation and find that they behave similarly to the results in Table II, where survey reviews are not related to prices and where text reviews are strongly related to escort prices. In column 5 we control for a host of escort and market specific characteristics and the result holds—the premium to face pictures is much larger than the premium to pictures overall, and body-only pictures are not significantly related to prices.

In Panel A of Table III we allow picture types to enter directly, but this can be problematic since escorts who convey different information may also use different numbers of pictures. In Panel B of Table III we use a specification that controls for the total number of pictures in an advertisement to focus on the composition of the information rather than the size. In column 1 of Panel B we include the number of pictures and the share of pictures that are face pictures. Consistent with the results in Panel A, the fraction of face pictures is strongly related to escort prices. A one standard deviation in the fraction of face pictures increases escort prices by 0.12 of a standard deviation. In column 2 we add the fraction of pictures that are body-only pictures and find that they are negatively related to prices, but their effect on prices (in absolute value) is much smaller than the effect of face pictures. In columns 3 and 4 we add measures of reputation, and in column 5 we add the fraction of each reputation measure that is positive, but

since these are almost always positive they have little effect on the results.[23] The inclusion of the additional reputation measures does lessen the magnitude of the effect of body-only pictures, and in column 5 they cease to be statistically significant. The effect of face pictures is robust to the inclusion of reputational measures.

Taken together, Tables II and III establish that information and reputation are important in the market for male sex work. While the amount of information matters (each picture increases prices by roughly 1.5%), the quality of the information matters more (each face picture increases prices by 3%). In fact, the entire premium to information in the market is driven by face pictures.[24] Also, reputation matters in the market, but only in the form of free-form text reviews, which contain more information about an escort's quality and behavior than survey reviews. The results support the idea that the information environment afforded by the internet allows male sex workers to disclose their type and receive a premium for doing so, and also supports the hypothesis that face pictures are a specific signal of quality in this market. More importantly, our results suggest that the value of information conveyed in an illegal market is similar to the value of information provided in a legal market environment.

VI. Considering Alternative Explanations

a. Marginal Face Value

Since our interpretation hinges on face pictures being a signal of quality, it is critical to estimate the marginal value of face pictures. The marginal value of face pictures should be a decreasing function of the number of face pictures. Once a threshold of believability is reached, additional pictures should not convey additional quality. If not, it would appear that escorts would be able to post as many face pictures as possible and charge higher fees. This would tell us that the signal had infinitely positive value, and that would certainly be difficult to justify. In our review of client forums, clients note that they look for multiple pictures of an escort's face, but there should be a limit to their value.

To estimate the marginal value of face pictures, we estimate a polynomial function of the value of face pictures.[25] We plot the marginal value as a function of the number of face pictures

[23] Specifications that used the fraction of reviews that were negative were negatively related to escort prices, but were not statistically significant.
[24] Note that the omitted category in Table III is non-face, non-nude pictures. This omitted category is not related to escort prices. See Appendix Table III for specifications that include all three picture types.
[25] We give the results for a third-degree polynomial specification in the appendix.

in Figure II. As the figure shows, the marginal value of face pictures decreases sharply, approaching zero at the seventh picture. We believe that these marginal values are consistent with our interpretation of the results. The average value of face pictures is large, but the marginal value of the 8th additional face picture is indistinguishable from zero. While the signal has value, excessive signaling is not rewarded in this market.

b. True Quality

It could be that clients are responding to empty signals of quality. Jin and Kato (2006) conducted an experiment on eBay.com auctions for baseball cards and found that while advertised quality was positively related to price, actual quality was not. They conclude that sellers in online markets target uninformed buyers, and that eBay.com's system of universal ratings and anonymous identities allows this situation to persist. Buyers could also be lulled into a false sense of security given the fraud protection offered by online auctions. Lewis (2009) contends that Jin and Kato's result may be due to the fact that the stakes are relatively low in the auctions that they study. It would certainly be true that the stakes for misrepresentation are high in the market we study, both in dollar value and the potential negative outcomes from misrepresentation. Furthermore, while buyers in online markets such as eBay.com have some form of formal protection from fraud, the clients of a male escort do not have any formal or implied guarantees against fraud: it is not possible for them to be lulled into a false sense of security by an escort's guarantee. The active policing we documented earlier shows that clients are not easily or consistently fooled. As such, while some portion of these results could be explained by uninformed consumers, it is likely to be small. Also, nearly every escort advertises that he is of the best quality. While signals of quality vary, claims of quality do not.

c. Beauty

One concern with the interpretation of our results is that the face picture premium could be due to a beauty premium and not signaling. Many papers document the premium to beauty in the labor market,[26] and it would be reasonable to conjecture that the premium may be even higher among sex workers. Arunachalam and Shah (2009) estimate the beauty premium for female sex workers and somewhat surprisingly find that while the estimated premium for above average beauty is slightly larger than that estimated for women elsewhere, the penalty for below average looks lies comfortably within the range of existing findings. This result is consistent

[26] See Daniel Hamermesh's website for a summary of findings from a number of studies.

with Hamermesh and Biddle (1994), who find no increase in the beauty premium for occupations requiring interpersonal contact. In our sample of sex workers it could certainly be the case that more attractive escorts are more likely to display pictures of their faces and, conditional on displaying any face picture, display more face pictures.[27]

We tackle the issue of beauty directly by obtaining beauty measures for the escorts in our dataset. We first discuss the issue that more attractive sex workers may display more face pictures, conditional on displaying any picture. We then discuss the potential selection issue that more attractive sex workers might be more likely to display face pictures in general. We asked a group of openly gay men and closeted men to rate the beauty of our male escorts from the perspective of a potential client. Beauty was scored from 1 to 5, with 1 being the least attractive, and 5 being the most attractive. Both gay and closeted men were requested to serve as enumerators since heterosexually identified men comprise a non-negligible portion of the client base (Friedman 2003; Sadownick 1996; Wright 2008; Logan 2009). Nearly 90% of the escorts who show their face pictures in our data were given beauty scores; the mean beauty score is 3 and the standard deviation 1.2.

In Panel A of Table IV we estimate the relationship between beauty and escort prices. Since subjective ratings of beauty and other personal characteristics may differ across enumerators, we include interviewer fixed effects in all specifications. In column 1 we re-estimate the premium to face pictures, for the sample of men for whom we also have beauty scores. The premium for each additional face picture is 1.5%, which is similar to our previous estimates. In column 2 we include the continuous measure of beauty, and find that while positively correlated with log hourly price, the coefficient is not statistically significant. However, our main face picture result remains statistically significant at the .01 level and has a magnitude of 1.5%. Therefore, even after controlling for escort beauty, our main result remains consistent and statistically significant. In column 3, we include all the various control variables, such as race, height, weight, body type, eye color, etc. and the beauty coefficient, though smaller and still positive, is not statistically significant.

In columns 4-5 in panel A of Table IV, we explore whether returns to beauty may be non-linear by including a dummy variable indicator for above average beauty (beauty score equals 4

[27] It is doubtful that all attractive escorts show their faces since men may not want long-lived evidence of their careers in commercial sex on the internet.

or 5) and below average beauty (beauty score equals 1 or 2). Again, neither of the beauty measures is statistically significant. However, the face premium coefficient is still 1.5% and significant at the .01 level. It appears that the inclusion of beauty and face pictures has no effect on the relationship between face pictures and escort prices. This relative lack of a relationship between escort beauty and prices is consistent with the literature on the variety of beauty standards in gay and heterosexual communities. For example, Carpenter (2003) has shown differential partnership and attractiveness patterns between gay men and heterosexuals by measures of physical well-being such as BMI. Also, there could be premiums in the market for men who would otherwise be considered unattractive if they had other attributes that were valued by the market, such as expertise in specific sexual conduct (Itiel 1998; Cameron, Collins, and Thew 1999; Friedman 2003).

Recall that the results in Panel A of Table IV estimate the beauty premium among men who show their faces. However, we can use the results of Table IV to roughly calculate how much beauty could explain the difference between men who do and do not show their face pictures. Assuming that all men who do not post their face picture are rated at the lowest beauty score and that men who do post their faces are rated as the highest beauty score, the differences in the beauty premium between the two groups in Table IV (3.6%) could explain, at best, less than a fifth of the face picture premium (our lowest estimate being 19.7%).[28] Put another way, the least attractive man is still better off showing a picture of his face than not, as the "no picture" penalty is more than five times as large as the "unattractive" penalty. This back-of-the-envelope calculation implies that beauty can explain, at best, a small fraction of the face picture premium.

We also address this issue indirectly by considering second order implications of our interpretation of the face picture premium. We conjecture that text reviews reveal information about the quality of the escort, but not the escort's beauty. If the premium to face pictures is due to beauty, then the interaction of face pictures with text reviews should be positive: beauty would be a complement to quality as described in the text reviews. If face pictures are a measure of quality, however, the interaction of face pictures and text reviews should be negative as face pictures are substitutes for client descriptions of quality. This also acts as a test of our

[28] We use the beauty premium estimated in column 2 of Table IV, the largest estimate of the beauty premium when we include the number of face pictures.

conceptual framework—in repeated signaling games the signal and reputation substitute for one another (Kaya 2009). When we include the interaction of face pictures and text reviews in Panel B of Table IV, the interaction is negative in both instances (-0.009 [0.004] and -0.028 [0.031] for number and fraction, respectively). The results do not change when we interact the number or fraction of face pictures with the number of positive text reviews (-0.004 [0.002], -0.009 [0.013] for number and fraction, respectively). We take this as suggestive evidence that face pictures convey the same quality information as text reviews, and therefore are substitutes for quality measures.

We also estimate a regression where we control for the presence of face pictures with a dichotomous indicator and also estimate the value of marginal pictures.[29] This is similar to the marginal estimates presented in Figure II. If face pictures only conveyed beauty, then the marginal value of additional face pictures would be zero. Otherwise, additional pictures would have value, although, as we argued earlier, that value would decrease with the number of pictures. The results indicate that, on average, additional face pictures come with a 1.5% price premium, similar to the estimate in Table IV. The premium we find applies to additional face pictures—two escorts of the same beauty would be paid differently if one supplied one face picture and the other supplied five. This is more consistent with the notion that face pictures establish quality rather than beauty, which can be ascertained from a single picture.[30] Given the evidence presented above, we believe it is unlikely that the majority of the face picture premium is driven by beauty.

d. Signaling Without Informal Enforcement

A key to our interpretation is the belief that informal policing conducted by clients causes the signals that escorts send to be credible. Without the informal enforcement, the value of the signal would certainly be suspect. Unfortunately, informal enforcement is difficult to test

[29] In this specification the premium to posting face pictures (the coefficient on the dichotomous indicator) is 15.3%. This implies that the beauty calculation we described earlier (3.6%) explains less than 25% of the face picture premium, even when excluding the marginal value of face pictures from the face picture premium.

[30] In our data we also have the physical characteristics of the escorts. If more beautiful escorts select into providing face pictures and have different physical characteristics, then a comparison of the distribution of characteristics of escorts who do and do not show face pictures would reveal such differences. Overall, the results show that along nearly every dimension of physical characteristics, the escorts who provide face pictures are statistically similar to those who do not. Out of more than twenty physical characteristics (e.g., hair color, eye color, body type), there are only three instances where escorts who show their face pictures are significantly different from those that do not: escorts who show their face pictures are more likely to be blond (14% versus 10%) and have an "athletic/swimmer's" build (50% versus 42%); escorts who do not show their faces are *more* likely to be muscular (34% versus 28%).

directly. Our data does give us one unique instance where we can observe the value of the signal when informal enforcement is lacking.

As noted earlier, in our online source escorts can choose whether or not they will allow themselves to be reviewed on the website. Disallowing reviews is all or nothing: escorts do not have the option of deleting or selectively posting reviews of either type. An escort who disallows reviews cannot establish a reputation in our data source. The vast majority of escorts (nearly 95%) allow themselves to be reviewed. In general the issue is moot since there is little variation.[31] The escorts in Las Vegas, however, allow themselves to be reviewed only 40% of the time. Las Vegas is particularly unique—there is no other city where less than 90% of the escorts disallow reviews. Of all escorts who disallow reviews, over 35% are located in Las Vegas. It is doubtful that this is a state effect since escorts in other Nevada cities allow reviews more than 90% of the time. While the exact cause of this curiosity is unknown,[32] we are able to test for the value of the signal in a location with little client policing. As we described earlier, client policing allows signaling to be credible, so without client policing, the value of the signal should be negligible.

For comparison, Table V shows summary statistics for escorts based in Las Vegas and escorts based in five other randomly selected cities with similar numbers of escorts. As the table shows, the cities are all similar in terms of rates and escort attributes such as height and weight. Similarly, escorts in Las Vegas post the same average number of face pictures as those in other cities. In general, the Las Vegas market looks similar to the other markets shown in Table V and to the overall market, except for the fact that only 40% of escorts allow reviews.

In Table V we replicate the regressions of Tables II and III for each city separately. In every other city we find a large and significant premium to face pictures that matches the population estimates. Both the dichotomous and continuous measures of face pictures yield estimates close to the overall values for each city except Las Vegas. This suggests that the value of signaling is reasonably stable across markets.

The results for Las Vegas are striking. In the Las Vegas market there is no premium to posting face pictures in an advertisement. This is not merely an artifact of statistical

[31] In our regressions we control for whether the escort allows himself to be reviewed.
[32] For examples of the narrative evidence that led us to consider the Las Vegas market, see the appendix. We conjecture that the disproportionate number of tourists in the Las Vegas market leads escorts to place little value in their reputations, or they may feel uniquely prone to poor reviews due to cultural misunderstandings with clients.

significance, the point estimates for the value of face pictures in Las Vegas (-0.09 for the dichotomous measure, 0.007 for the continuous measure) are much lower than for every other city in Table V. In the one location where client policing is stymied, the credibility of the signal is in doubt and market prices do not respond to the signal. This result conforms to our interpretation of the premium to face pictures in the market.[33] We also note that these results are inconsistent with either a beauty or face-pictures-as-quality interpretation, unless one was willing to argue that escorts in Las Vegas were markedly less attractive than other escorts or are of uniformly different quality than escorts in other cities.

VII. Robustness

a. Prices

A primary concern for our results is the quality of the price measure. We use the prices quoted by escorts in their advertisements, but it could be that the actual prices differ for a number of reasons. Though our qualitative evidence suggests that the prices posted are the prices paid, it could be that escorts are more willing to price discriminate once they are in the bedroom. If this is the case, our empirical strategy will yield biased estimates of the value of the signal. Fortunately, we have spot prices, specific transaction prices recorded by clients from the most recent text reviews of escorts, which we manually inspected and which we can compare to the prices that escorts post in their advertisements. Additionally, there are a small number of escorts who do not post their price, but have a spot price. As these are prices actually paid by clients in specific appointments, we can check our results with these prices.

We should note that spot prices are well correlated with posted prices (r = 0.89). Even so, we check our results with spot prices in two ways. First, we replace existing prices with spot prices where available. These results are reported in Columns 1-3 of Table VI, which replicate the regressions in column 5 of Table II (1), column 5 of Table III- Panel A (2), and column 5 of Table III- Panel B (3). The results with the spot prices replacing the posted prices do not alter the results. As a more stringent test, we use only spot prices in columns 4-6 of Table VI. Using only spot prices as our dependent variable substantially reduces the size of our sample, but we still find that the presence of face pictures yields a premium of more than 15%. The premium to

[33] It would be cavalier to suggest that these results for Las Vegas are definitive. Since there is no other location in the data with this same information differences, it is not possible to distinguish this effect from a location effect. While there is evidence that clients are aware of the increased probability of encountering low quality escorts, it is unclear if the escorts in Las Vegas are aware of the low value of information in their market.

each face picture is slightly smaller and may be due to the fact that the variation in the number of face pictures is much smaller for men with text reviews.

Another potential concern with our results is that they could be driven jointly by reputation and information. Although we have included measures of reputation in all of our specifications, it could be that men supply higher quality information once their reputation is established, rather than the reverse. In a repeated game, for example, one can conjecture that face pictures are not the signal, but positive first encounters which lead to positive reputations and repeat clients that help clients differentiate. If the market is dominated by clients returning to the same escorts with whom they have had a good first encounter, it will drive our results.

We test for this reverse determination by looking at escorts who have no reputation to speak of, they have neither survey reviews nor text reviews. These could be new escorts in the market or old escorts who are abandoning an older profile. On the one hand, escorts with no reputation are unknown and could be more likely to signal against type. On the other hand, the only information a client can use to determine the quality of these escorts is the information conveyed in their advertisement, so the signal may be particularly valuable. In either case, those with no reputation can only disclose their type through the information in their advertisement.

In columns 7-9 of Table VI we regress price on our usual set of covariates for escorts with no reputation. The results show that face pictures matter more for escorts with no reputation. The premium to the presence of face pictures is over 18%. The premium to each individual face picture is more than 3%, slightly higher than the premium estimated for escorts overall. Therefore, it seems that when escorts do not have an established reputation, signaling may be even more important.

b. Selection

Escorts do not have to post their prices in their advertisements, although well over 85% of the men in our data do. For example, an escort can list that he provides a given service (incall or outcall), but may not post the price for that service. Our results could overstate the effects of information if there is selection into posting prices that varies with the information content of the advertisement, which could lead to selection in either direction. It could be that escorts who post more pictures or more face pictures are more likely to post their prices since they have signaled their quality. Conversely, they could be less likely to not post their prices in order to seize as much consumer surplus as possible from clients, and similar ideas could be given for escorts

with few pictures or no face pictures. These types of arguments could be extended to the reservation wages of escorts who do or do not provide a certain set of information to the market, which itself could alter the estimate of the returns to signaling quality in the market. To test whether the number or type of pictures has any impact on the decision to post prices, we estimate a probit model where the outcome is whether the escort posts prices. The results of these regressions are reported in Table VII. We find that the number of pictures, the presence of face and/or body pictures, and the number of face and body pictures do not significantly predict the decision to post prices. This holds when we consider a number of alternative specifications and when we include or exclude additional controls. We take this as evidence that the decision to post prices is not influenced by the other information in the advertisement itself.

VIII. Conclusion

Male sex workers are unique in illegal markets: they price independently without intermediaries, use a rich information environment to solicit clients, and their large number creates a competitive setting where we expect markets to fully function. Since formal institutional enforcement is non-existent, the market could be plagued with adverse selection. However, it appears that the rich information environment offered by the internet overcomes some of the problems of asymmetric information. We find that escorts do convey a great deal of information through their advertisements and that the market rewards this information.

Not only do we find a sizable information premium in this market, but the magnitude is similar to the premium seen in legal markets. Furthermore, we use our institutional knowledge of male sex work and show that escorts use face pictures to signal their quality and low likelihood of misrepresentation. Empirically, the reward to face pictures is substantial; it is the driving force behind the premium to information in this market.

We note a caveat to our results. Although it would be tempting to argue that our results show that informal institutions such as client-policing are close substitutes for formal institutions such as courts, it could well be true that the premium to information we observe is due entirely to the complementary effects of informal institutions. Even in markets with formal contracts and enforcement, the types of forums created by the clients of male sex workers are common (e.g., AngiesList.com). As we documented, client communication dramatically raises the costs of

deception because detection is likely. A dishonest escort may swindle one or two clients, but the possibility of doing so frequently is small. Informal policing is critical to this market.

The relationship between formal and informal institutions is inherently complex. We can say little about their interaction since formal institutions play no role here. More empirical research is needed on the interaction of formal and informal institutions to estimate the degree of substitutability or complementarity between the two. While our results do not address how much the premium to signaling would change if there was formal enforcement in this market, we provide novel evidence that rich information environments alone allow escorts and clients to overcome the problems of asymmetric information. As a result, information is valuable in this illegal market, just as it is in legal markets.

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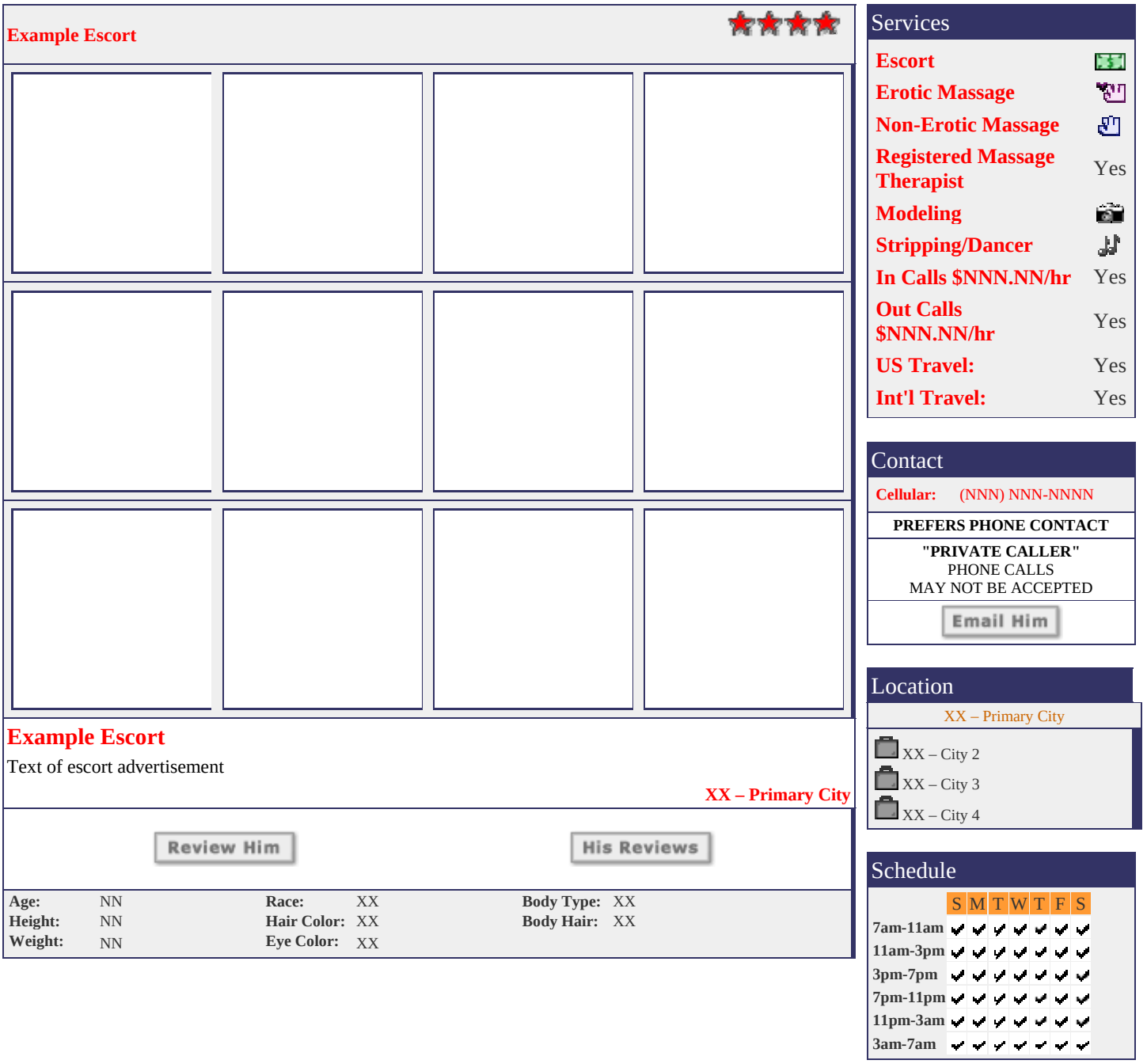

Figure I
Diagram of Escort Advertisement

Figure II
The Marginal Value of Face Pictures

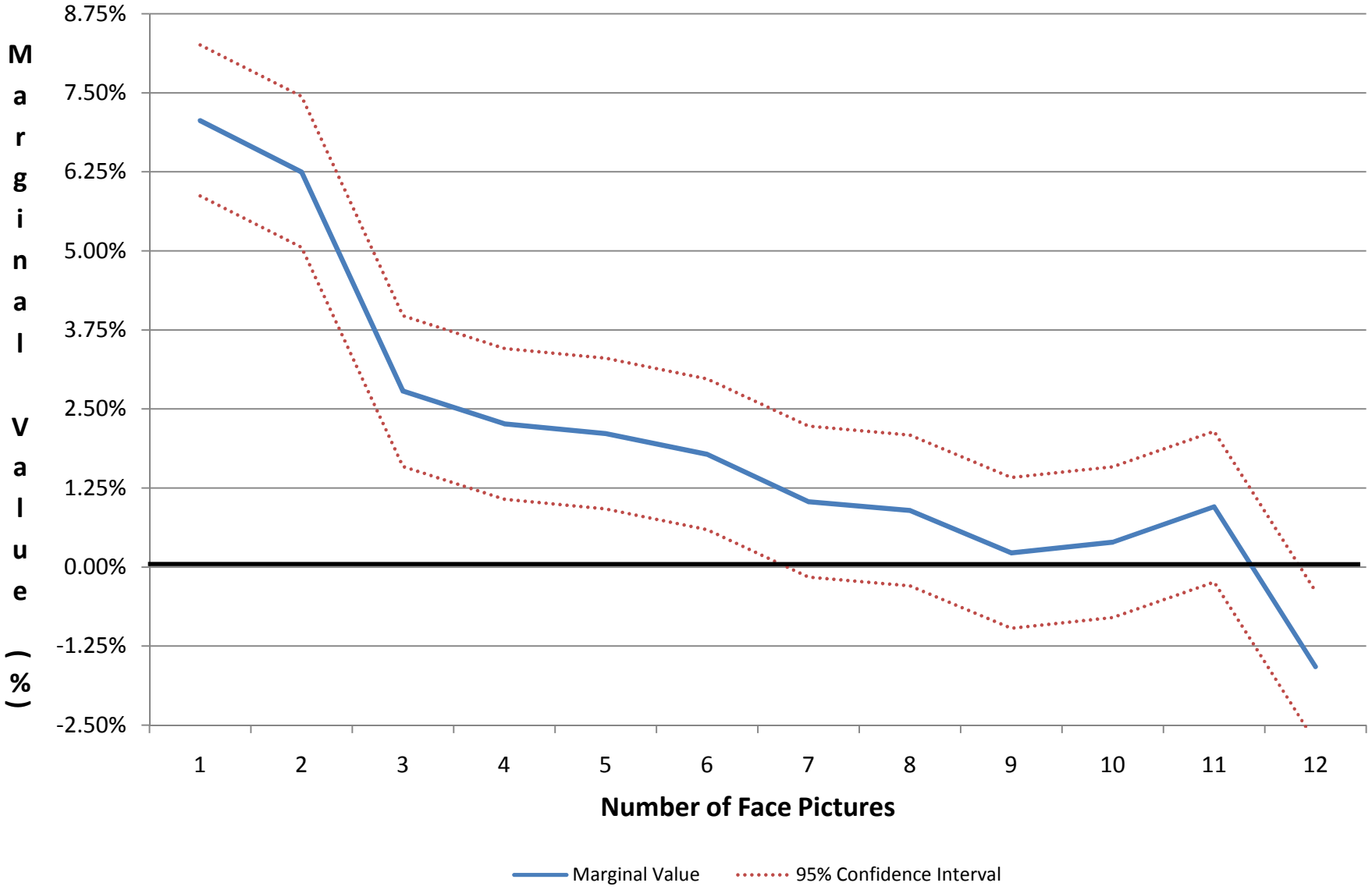

Table I

Summary Statistics for the Escort Sample

	Whole Sample			No Face Pictures			Face Pictures		
Variable	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Price	1476	216.88	64.46	488	187.09	64.54	988	231.59	59.15
Log of Price	1476	5.34	0.29	488	5.18	0.31	988	5.41	0.25
Spot Price	1534	217.86	64.49	506	188.52	64.52	1028	232.30	59.40
Weight	1932	167.11	24.54	635	169.73	24.93	1297	165.83	24.25
Height	1932	70.43	2.69	635	70.55	2.56	1297	70.37	2.75
Age	1932	28.20	6.93	635	29.54	7.02	1297	27.54	6.79
Black	1932	0.22	0.41	635	0.24	0.43	1297	0.21	0.41
Hispanic	1932	0.14	0.35	635	0.14	0.35	1297	0.14	0.35
Multiracial	1932	0.08	0.28	635	0.09	0.28	1297	0.08	0.28
Other Race	1932	0.01	0.10	635	0.01	0.10	1297	0.01	0.10
White	1932	0.54	0.50	635	0.50	0.50	1297	0.56	0.50
Asian	1932	0.01	0.12	635	0.03	0.16	1297	0.01	0.09
Number of Pictures	1932	6.14	2.84	635	5.17	2.81	1297	6.61	2.73
Body Only Pictures	1932	2.08	2.07	635	3.16	2.39	1297	1.55	1.66
Face Pictures	1932	2.90	2.96	635	0.00	0.00	1297	4.32	2.63
Survey Reviews	1932	3.18	6.72	635	3.25	7.43	1297	3.15	6.34
Text Reviews	1932	0.35	1.03	635	0.36	1.16	1297	0.35	0.96
Fraction Good Survey	1137	0.88	0.27	357	0.86	0.31	780	0.89	0.25
Fraction Good Text	347	0.88	0.30	107	0.89	0.29	240	0.87	0.31

Notes:

Fraction Good Survey and Fraction Good Text are defined over escorts with survey or text reviews, respectively.

Price is the outcall price posted by an escort in his advertisement.

If an escort has both a spot price and a posted price, or no posted price and a spot price, the spot price replaces the posted or missing price.

See the data appendix for variable definitions.

Table II
Information, Reputation and the Price of Male Escort Services

	(1)	(2)	(3)	(4)	(5)
Number of Pictures	0.0168***	0.0165***	0.0156***	0.00777***	0.00969***
	[0.0024]	[0.0029]	[0.0029]	[0.0021]	[0.0022]
Log of No. of Reviews		0.00352	-0.0111	-0.00943	-0.00762
		[0.010]	[0.010]	[0.0096]	[0.0098]
Log of No. of Text Reviews			0.0881***	0.0925***	0.0918***
			[0.014]	[0.012]	[0.012]
Has Face Pictures?				0.195***	0.180***
				[0.046]	[0.048]
Has Body Only Pictures?					-0.0632***
					[0.014]
Additional Controls^	X	X	X	X	X
Observations	1475	1475	1475	1475	1475
R-squared	0.22	0.22	0.23	0.31	0.32

Robust standard errors in brackets are clustered at the state level (*** p<0.01, ** p<0.05, * p<0.1)

Notes:
Each Column is an OLS regression where the dependent variable is the log of the price.
^Each column includes controls for race, age, height, weight, state, top, bottom, versatile, whether the escort was available all day, body type, body hair, whether the escort advertised safer sex, eye color, review allowed, and whether the escort preferred phone contact.
See the data appendix for variable definitions.

Table III

Quality of Information and the Price of Male Escort Services

Panel A: Number of Types of Pictures

	(1)	(2)	(3)	(4)	(5)
No. of Face Pictures	0.0317***	0.0305***	0.0293***	0.0286***	0.0283***
	[0.0060]	[0.0055]	[0.0058]	[0.0057]	[0.0056]
No. of Body Only Pictures		-0.00468	-0.00617	-0.0069	-0.00493
		[0.0039]	[0.0042]	[0.0042]	[0.0037]
Log of No. of Reviews			0.0146	-0.0037	-0.0104
			[0.0089]	[0.010]	[0.0096]
Log of No. of Text Reviews				0.103***	0.0913***
				[0.018]	[0.014]
Additional Controls^					X
Observations	1475	1475	1475	1475	1475
R-squared	0.22	0.22	0.22	0.24	0.29
Robust standard errors in brackets are clustered at the state level (*** p<0.01, ** p<0.05, * p<0.1)					

Panel B: Composition of Pictures

	(1)	(2)	(3)	(4)	(5)
Number of Pictures	0.0139***	0.0140***	0.0126***	0.0114***	0.00987***
	[0.0021]	[0.0021]	[0.0026]	[0.0026]	[0.0022]
Fraction Face Pictures	0.241***	0.191***	0.190***	0.194***	0.216***
	[0.050]	[0.057]	[0.058]	[0.058]	[0.056]
Fraction Body Only Pictures		-0.0806**	-0.0821**	-0.0768**	-0.0318
		[0.034]	[0.035]	[0.034]	[0.031]
Log of No. of Reviews			0.0133	-0.00338	-0.0234**
			[0.0091]	[0.010]	[0.0099]
Log of No. of Text Reviews				0.0961***	0.0575***
				[0.017]	[0.018]
Fraction 4 Star Reviews					0.0396
					[0.026]
Fraction Positive Text Reviews					0.0424
					[0.030]
Additional Controls^					X
Observations	1475	1475	1475	1475	1475
R-squared	0.24	0.25	0.25	0.26	0.32
Robust standard errors in brackets are clustered at the state level (*** p<0.01, ** p<0.05, * p<0.1)					

Notes: Each Column is an OLS regression where the dependent variable is the log of the price.
Each column includes controls for state. ^Column 5 includes controls for race, age, height, weight, top, bottom, versatile, whether the escort was available all day, body type, body hair, if the escort advertised safer sex, eye color, review allowed, and whether the escort preferred phone contact.
See data appendix for variable definitions.

Table IV

Is the Data Consistent with a Beauty Interpretation?

Panel A: Beauty and Face Pictures

	(1)	(2)	(3)	(4)	(5)
Face Picture	0.0149***	0.0153***	0.0132***	0.0153***	0.0131***
	[0.0034]	[0.0034]	[0.0038]	[0.0035]	[0.0039]
Beauty		0.0089	0.007		
		[0.0063]	[0.0063]		
Above Average Beauty				0.0076	-0.0006
				[0.0249]	[0.0247]
Below Average Beauty				-0.0155	-0.0195
				[0.0253]	[0.0251]
Additional Controls^			X		X
Observations	849	849	849	849	849
R-squared	0.04	0.03	0.02	0.04	0.14

Panel B: The Interaction of Escort Reputation and Information

	(1)	(2)	(3)	(4)
No. of Face Pictures * Text Reviews	-0.00922**			
	[0.0035]			
No. of Face Pictures * Positive Text Reviews		-0.00373**		
		[0.0015]		
Fraction Face * Text Reviews			-0.0278	
			[0.031]	
Fraction Face * Positive Text Reviews				-0.0092
				[0.013]
Additional Controls^	X	X	X	X
Observations	1475	1475	1475	1475
R-squared	0.29	0.29	0.32	0.32

Robust standard errors in brackets are clustered at the state level *** p<0.01, ** p<0.05, * p<0.1

Notes: Each Column is an OLS regression where the dependent variable is the log of the price. Beauty is measured on a 1 to 5 scale with 5 being the most beautiful. Above average beauty is a beauty measure greater than 3, and below average beauty is a beauty measure less than 3. In panel A, each colum includes fixed effects for each beauty enumerator. In panel B, columns 1 and 2 also include the number of face pictures and number of body pictures. In panel B, columns 3 and 4 also include the number of pictures and fraction of face and body pictures. ^Columns 3, 5 in Panel A and each column of Panel B includes controls for race, age, height, weight, state, top, bottom, versatile, whether the escort was available all day, body type, body hair, whether the escort advertised safer sex, eye color, review allowed, whether the escort preferred phone contact, number of survey reviews, number of text reviews, and the fraction of highly-rated survey and text reviews, respectively. See the data appendix for variable definitions.

Table V

Enforcement Proxy and the Value of the Signal

Panel A: Summary Statistics by City

	Las Vegas	Chicago	Atlanta	Houston	Dallas	Boston
Observations	65	78	76	65	92	54
Review Allowed?	0.40	0.96	0.93	0.98	0.95	0.96
	(0.49)	(0.20)	(0.26)	(0.12)	(0.22)	(0.19)
Price	227.36	231.79	232.74	209.9	207.12	232.13
	(66.95)	(57.20)	(86.38)	(57.93)	(62.65)	(51.74)
No. of Pictures	6.44	6.38	6.52	6.18	6.46	6.24
	(2.75)	(2.57)	(2.82)	(2.69)	(2.77)	(2.97)
No. of Face Pictures	2.80	2.73	3.43	2.41	2.15	2.79
	(2.81)	(2.77)	(3.04)	(3.09)	(2.52)	(3.42)
Age	28.75	27.48	27.33	26.35	29.31	26.7
	(6.97)	(6.02)	(6.19)	(6.29)	(6.91)	(5.88)
Height	70.88	70.62	70.56	70.06	70.44	69.76
	(2.70)	(2.95)	(2.59)	(2.49)	(2.67)	(2.80)
Weight	172.23	166.59	166.46	168.02	169.41	165.43
	(25.02)	(30.16)	(21.77)	(23.48)	(24.47)	(31.31)

Panel B: Estimates of the Value of Any Face or Body Pictures in Escort Advertisements

	Las Vegas	Chicago	Atlanta	Houston	Dallas	Boston
Has Face Pictures?	-0.086	0.257***	0.221**	0.350***	0.347***	0.253**
	[0.097]	[0.056]	[0.090]	[0.080]	[0.049]	[0.093]
Has Body Pictures?	-0.141	-0.114*	-0.0706	-0.0834	-0.0407	-0.0314
	[0.092]	[0.060]	[0.097]	[0.093]	[0.069]	[0.091]
R-squared	0.4	0.39	0.16	0.53	0.6	0.35

Panel C: Estimates of the Value of Face and Body Pictures in Escort Advertisements

	Las Vegas	Chicago	Atlanta	Houston	Dallas	Boston
No. of Face Pictures	0.00742	0.0300***	0.0285*	0.0355**	0.0449***	0.0279*
	[0.017]	[0.011]	[0.016]	[0.015]	[0.011]	[0.014]
No. of Body Only Pictures	0.00208	0.00228	-0.0262	-0.0105	-0.00726	0.00243
	[0.024]	[0.015]	[0.022]	[0.021]	[0.013]	[0.021]
R-squared	0.33	0.18	0.19	0.27	0.48	0.22

Standard deviations in parentheses. Robust standard errors in brackets (*** p<0.01, ** p<0.05, * p<0.1). Panels B and C include the following additional variables in the regressions: number of survey reviews, number of text reviews, fraction of survey and text reviews that are positive, age, height, weight, and race. Panel B includes the total number of pictures. See data appendix for variable definitions.

Table VI

Robustness Checks for Information Quality and the Price of Male Escort Services

	Spot Prices			*Spot Prices Only*			*Escorts with No Reputation*		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Number of Pictures	0.00901***		0.00970***	0.00724		0.00976	0.00695		0.00927*
	[0.0023]		[0.0021]	[0.0079]		[0.0076]	[0.0047]		[0.0046]
Has Face Pictures?	0.177***			0.168***			0.188***		
	[0.048]			[0.061]			[0.059]		
Has Body Only Pictures?	-0.0587***			-0.0293			-0.0431**		
	[0.014]			[0.035]			[0.020]		
No. of Face Pictures		0.0266***			0.0142*			0.0318***	
		[0.0054]			[0.0074]			[0.0084]	
No. of Body Only Pictures		-0.00469			-0.0041			-0.00995	
		[0.0038]			[0.013]			[0.0078]	
Fraction Face Pictures			0.213***			0.089			0.234***
			[0.056]			[0.064]			[0.084]
Fraction Body Only Pictures			-0.0272			-0.11			-0.0158
			[0.032]			[0.092]			[0.053]
Log of No. of Reviews	-0.00909	-0.0115	-0.0099	-0.0405	-0.0333	-0.0358			
	[0.0100]	[0.0098]	[0.0098]	[0.025]	[0.031]	[0.031]			
Log of No. of Text Reviews	0.0941***	0.0934***	0.0917***	0.0811**	0.0662	0.0614			
	[0.013]	[0.017]	[0.016]	[0.032]	[0.042]	[0.039]			
Additional Controls^	X	X	X	X	X	X	X	X	X
Observations	1533	1533	1533	243	243	243	610	610	610
R-squared	0.32	0.28	0.31	0.51	0.46	0.48	0.32	0.3	0.32

Robust standard errors in brackets are clustered at the state level (*** p<0.01, ** p<0.05, * p<0.1)

Notes: Each column is an OLS regression. In columns 1-3 is the log of the spot price. If an escort has both a spot price and a posted price, or no posted price and a spot price, the spot price replaces the posted or missing price. Dependent xariable in Columns 4-6 is the log of the spot price only. Dependent variable in Columns 7-9 is the log of the price (for escorts with no reviews only). ^Each column includes controls for race, age, height, weight, state, top, bottom, versatile, whether the escort was available all day, body type, body hair, whether the escort advertised safer sex, eye color, review allowed, and whether the escort preferred phone contact. See data appendix for variable definitions.

Table VII
Information and Selection into Posting Escort Prices

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Number of Pictures	0.00245	0.0024	0.00286	0.00304			
	[0.0036]	[0.0034]	[0.0031]	[0.0031]			
Has Face Pictures?		0.00112	-0.00181	0.00007			
		[0.017]	[0.018]	[0.019]			
Has Body Only Pictures?			-0.012	-0.0154			
			[0.022]	[0.021]			
No. of Face Pictures					0.00448	0.0058	0.00634
					[0.0030]	[0.0038]	[0.0040]
No. of Body Only Pictures						0.00473	0.00372
						[0.0054]	[0.0054]
Additional Controls^				X			X
Observations	1932	1932	1932	1932	1932	1932	1932
Pseudo R-squared	0.0517	0.0517	0.052	0.055	0.0528	0.0535	0.0566

Robust standard errors in brackets are clustered at the state level (*** p<0.01, ** p<0.05, * p<0.1)

Notes:
Each column reports results of a probit regression where the dependent variable is: Does Escort Post Prices? (Mean of dependent variable = 0.85, Standard Error of dependent variable =0.36)
The coefficients reported are the marginal effects of the probit regressions. For continuous variables (such as "Number of Pictures") the effect is evaluated at the mean. For dichotomous variables (such "Has Face Pictures?") the effects calculate the change in probability from moving from 0 to 1.
Each column includes controls for state. ^Columns 4 and 7 include controls for race, age, height, weight, top, bottom, versatile, whether the escort was available all day, body type, body hair, review allowed, whether the escort advertised safer sex, eye color, and whether the escort preferred phone contact.
See data appendix for variable definitions.

Appendix 1: Further Results

Appendix Table I replicates the results in our paper using the "incall" price, where a client goes to the escort. While one may be concerned that the incall results could be different because of the different type of call (and the fact that the escort must give a client his specific location in order to host an incall), all of the results are robust to the difference in price type. Appendix Table II presents results for a logarithmic specification, where the log of pictures is used as the explanatory variable rather than the level. Appendix Table III shows the specification where the third category of pictures (non-nude, non-face pictures) are included in the specification. This category of picture cannot be included in the specifications in Table II or Table III due to colinearity, but their inclusion into specifications such as those in the top panel of Table III increase the size of the effect of face pictures on escort prices.

Appendix 2: Data Appendix

Our data is the universe of men advertising on our site in the United States at the time of data collection. Our data is the entire population of escorts—we collected the data by searching through every geographic listing in the US during the period of data collection (January 2008 to May 2008). Each escort has a page specific to him that we used to gather the information. The website generates it income from escorts only, clients do not pay to access any ads and no portion of the site is restricted from the public. By agreement, the url of the website and its parent company are not listed.

There are other websites available for clients of male sex workers. In Appendix Table IV we compare the number of escorts on our chosen site to those on its two most prominent competitors. For each city we list, we also include the Gay Concentration Index developed by Black, Sanders, and Taylor (2007), which shows the concentration of gay households in the Metropolitan Statistical Area (MSA) over the national average. This is done so that readers can gauge the depth of the website by some measure of gay location patterns, which can differ from those of heterosexuals (Black, et al. 2002).

In Panel A of Appendix Table IV we show total numbers of escorts from a sample of large cities. As the panel indicates, our online source contains more advertisements than either competitor in all cities. This is true even though the other sites allow for double counting: escorts can list themselves in multiple cities, inflating the numbers of escorts in each city. Focusing on the largest cities may obscure important heterogeneity across regions, so we also look at the geographic dispersion beyond the largest cities. Panel B shows escort numbers from a random sample of smaller cities. Here we count only the escorts in our source by their home base, while we count the total number of escorts for the other sites regardless of their home base. This implies we upwardly bias the number of escorts by city for the two competitors. Even using this method, our website's coverage of the male escort market is greater than that of the two competitors, and this holds for cities with high and low gay concentrations. The last two columns of Panel B show the number of escorts on our site who we could locate on Competitor 1, the most prominent competitor, and vice versa.[1] While the majority of the escorts who advertise on competitor sites could also be located on our site, only a small fraction of the escorts in our source could be identified on the competitor's site.

We are able to identify each escort uniquely using the following information (See Figure I for a diagram of an escort advertisement):

User ID: Each escort account on the site has a unique user ID. This allowed us to check against the possibility of double counting escorts who may change location over the data collection period.
User Name: Each escort has a username that is displayed next to the ID number at the top of the ad.

[1] As of March 15, 2009, Competitor 1 had 1,413 unique escorts in the US, and Competitor 2 had less than 1,000, while we have more than 1,900 in our data.

The measures we use in the paper are described below:
Services Provided: Under this heading each escort has the option of noting the following services, which we recorded

Incall: Escort responds "yes" or "no"
Outcall: Escort responds "yes" or "no"
Incall Price: The price (by the hour) that incall services are provided at if incalls provided
Outcall Price: The price (by the hour) that outcall services are provided at if outcalls provided

Contact Information: Under this heading each escort has the option of noting the following

Phone: Phone number with area code (we record if a number is listed y/n)
Cellular: Cellular number with area code (we record if a number is listed y/n)
Pager: Pager number with area code (we record if a number is listed y/n)
Prefers Phone Contact: Listed if escort prefers for clients to contact him by phone (y/n)
Prefers E-mail Contact: Listed if escort prefers for clients to contact him by phone (y/n)

Location: The location listed under the heading is the primary location, the locations with suitcase avatars next to them are cities the escort is willing to travel to. In some instances, exact dates are listed under specific travel cities, and this means that an escort is traveling to that city on those dates and will serve clients in those cities on those dates. We record all of these locations.
Availability: This box records an escort's weekly availability in a matrix of 6 four hour blocks. Since the majority of escorts (78.0%) check every box (indicating that they are available at any time) we record whether or not the entire matrix is filled in as a measure of labor supply (y/n).

Age: Age is recorded in years
Height: Height is reported in feet and inches, we record height in inches
Weight: Weight is listed in 20 pound intervals beginning at 130 pounds and ending at 200 pounds (e.g. 150-170 pounds). We took the midpoint of the range given by an escort. If the escort's text ad listed a weight we recorded that exact weight in place of the midpoint range.
Race: White, Black/African-American, Asian, Hispanic, Multiracial, or Other
Hair Color: Black, Blonde, Brown, Grey, and Red
Eye Color: Black, Blue, Brown, Green, Hazel
Body Type: Athletic/Swimmer's Build, Average, A few extra pounds, muscular/buff, thin/lean
Body Hair: Hairy, Moderately hairy, Shaved, Smooth

For the text of escort ads we record the mention of the following (Note: since the ads were read as opposed to scripts we do not record the instance of the word but its meaning, which can be implied from the context)

Top: The escort stated that they are a top (the penetrative partner in anal sex)
Bottom: The escort stated that they are a bottom (the receptive partner in anal sex)
Versatile: The escort indicated that they are versatile (both top and bottom)
No Attitude: The escort noted that they have "no attitude"/are willing to see clients without regard to race, body type, physical appearance, disability, etc.
Safe: The escort noted that he is disease drug free/ only participates in safer sex

Note: In American gay society, men may not only be tops, bottoms, or versatile, but also "versatile tops" and "versatile bottoms." The meaning of such terms is the distinction between one man who would rarely/never partake in an activity (a "top" would never perform as a "bottom" and vice versa), and a man who occasionally partakes in an activity (a "versatile top" would occasionally bottom and vice versa). These terms are well established in gay society (Sadowick 1996).

Pictures: We recorded the number of unique pictures in each ad (e.g., the same picture used twice in an ad was only recorded in the first instance). The maximum number of pictures allowed per advertisement is 12. Each picture in an advertisement is a thumbnail that may be enlarged by selecting the picture.

Each picture was individually inspected. Pictures that contained blurry and unrecognizable faces are noted as pictures but not noted as a type of picture, and are therefore included in the omitted category in the regressions. The number of pictures in the following categories were recorded.

Number of Pictures: The total number of unique pictures in an escort's ad

Face Pictures: Pictures that show an escort's face only and pictures that show an escort's face as well as other body parts (nude or non-nude).

Body Only Pictures: Pictures that do not show an escort's face but do display the frontal genital area, the buttocks, or a combination thereof.

Review Allowed: If an escort has disabled the option to be reviewed we note it. Note that disabling reviews does not delete existing reviews of the escort, and only applies to survey reviews. Well over 90% (93.9%) of escorts allowed themselves to be reviewed.

Reviews: Reviews of both types (text and survey) can only be posted by registered member of the site. As registration is free, it is possible for anyone to post a review of an escort, and we do not view the registration requirement as a hindrance for posting a review. We record the following from the reviews

Number of Reviews: The total number of survey reviews

Number of Four-Star Reviews: The number of four-star reviews recorded for that escort

Text Reviews: The total number of text reviews for an escort

Hire Again: The number of text reviews in which the reviewer indicated that they would hire the escort again.

Spot Prices: For the most recent text review, we record the price and the price type (e.g., incall or outcall). If the appointment is a weekend or evening price we record it as weekend or evening prices and do not use these extended appointment prices as spot prices in our paper.

Appendix 3: Narrative Evidence Regarding the Las Vegas Escort Market

We provide examples of the narrative evidence that led us to consider the Las Vegas market below.

> Keep in mind that Vegas has a long history of crappy escorts, especially who claim to be jocks.
>
> Be cautious with pros in Vegas, because of the massive tourism turnover they can make fairly good money without being any good (it's not like they need repeat business). Old/wrong photos are your first hint to call it off. So is a request for money up front, as always.
>
> Vegas is a crapshoot (!) The guys there are scammers. They make their money off the strip tourists, so they don't worry about providing good service.

Our conjecture is that the Las Vegas market is unique due to its almost exclusive dependence on tourist clients, whereas other cities have large numbers of resident clients in addition to travelers. The dependence on tourist clients does not explain why or how Las Vegas escorts choose to disallow reviews of themselves on the escort website. One argument is that lack of repeat business would lead one not to care about reputation, but it is still the case that a good reputation would help to attract new clients. It could also be the case that the increased probability of serving foreign clients creates a disproportionate number of negative reviews due to cultural misunderstandings. Policing differences in Las Vegas are another possibility. Given the lack of hard evidence consistent with any of these explanations we resist the temptation to attach any one explanation to this market, other than exploiting the dearth of client reviews as we do in the text.

Appendix Table I

Quality of Information and the Price of Male Escort Services (Incall Prices)

Panel A: Number of Types of Pictures

	(1)	(2)	(3)	(4)	(5)
No. of Face Pictures	0.0255***	0.0242***	0.0217***	0.0207***	0.0206***
	[0.0045]	[0.0044]	[0.0043]	[0.0041]	[0.0037]
No. of Body Only Pictures		-0.00487	-0.00803	-0.00917*	-0.0073
		[0.0048]	[0.0051]	[0.0051]	[0.0048]
Log of No. of Reviews			0.0318***	0.0156	0.00609
			[0.0086]	[0.011]	[0.010]
Log of No. of Text Reviews				0.101***	0.0909***
				[0.021]	[0.022]
Additional Controls^					X
Observations	1125	1125	1125	1125	1125
R-squared	0.19	0.2	0.2	0.21	0.27

Robust standard errors in brackets are clustered at the state level *** p<0.01, ** p<0.05, * p<0.1

Panel B: Composition of Pictures

	(1)	(2)	(3)	(4)	(5)
Number of Pictures	0.0117***	0.0118***	0.00857**	0.00709**	0.00531
	[0.0033]	[0.0033]	[0.0033]	[0.0035]	[0.0033]
Fraction Face Pictures	0.195***	0.158***	0.159***	0.159***	0.179***
	[0.037]	[0.042]	[0.044]	[0.044]	[0.048]
Fraction Body Only Pictures		-0.0582	-0.0622	-0.0608	-0.0192
		[0.042]	[0.043]	[0.042]	[0.048]
Log of No. of Reviews			0.0322***	0.0174	-0.0137
			[0.0091]	[0.011]	[0.0097]
Log of No. of Text Reviews				0.0967***	0.0721**
				[0.021]	[0.032]
Fraction 4 Star Reviews					0.0623**
					[0.029]
Fraction Positive Text Reviews					0.0241
					[0.040]
Additional Controls^					X
Observations	1125	1125	1125	1125	1125
R-squared	0.21	0.21	0.21	0.22	0.28

Robust standard errors in brackets are clustered at the state level *** p<0.01, ** p<0.05, * p<0.1

Notes: Each Column is an OLS regression where the dependent variable is the log of the incall price (μ= 5.18, s.d. = 0.32) Each column includes controls for state. ^Column 5 includes controls for race, age, height, weight, top, bottom, versatile, whether the escort was available all day, body type, body hair, if the escort advertised safer sex, eye color, review allowed, and if the escort preferred phone contact.

Appendix Table II

Logarithmic Specification for Quality of Information and the Price of Male Escort Services

Panel A: Number of Types of Pictures

	(1)	(2)	(3)	(4)	(5)
Log of No. of Face Pictures	0.125***	0.121***	0.117***	0.116***	0.114***
	[0.024]	[0.024]	[0.025]	[0.025]	[0.025]
Log of No. of Body Only Pictures		-0.0112	-0.016	-0.017	-0.0124
		[0.012]	[0.013]	[0.013]	[0.011]
Log of No. of Reviews			0.0162*	-0.00268	-0.00915
			[0.0090]	[0.011]	[0.010]
Log of No. of Text Reviews				0.104***	0.0920***
				[0.017]	[0.013]
Additional Controls^					X
Observations	1475	1475	1475	1475	1475
R-squared	0.24	0.24	0.24	0.26	0.31

Robust standard errors in brackets are clustered at the state level *** p<0.01, ** p<0.05, * p<0.1

Panel B: Composition of Pictures

	(1)	(2)	(3)	(4)	(5)
Log of No. of Pictures	0.0889***	0.0901***	0.0818***	0.0752***	0.0603***
	[0.015]	[0.015]	[0.017]	[0.018]	[0.016]
Fraction Face Pictures	0.241***	0.189***	0.189***	0.192***	0.216***
	[0.050]	[0.057]	[0.058]	[0.057]	[0.056]
Fraction Body Only Pictures		-0.0823**	-0.0837**	-0.0783**	-0.0333
		[0.034]	[0.035]	[0.033]	[0.031]
Log of No. of Reviews			0.0137	-0.00321	-0.0221**
			[0.0091]	[0.010]	[0.0100]
Log of No. of Text Reviews				0.0968***	0.0588***
				[0.017]	[0.018]
Fraction 4 Star Reviews					0.0381
					[0.026]
Fraction Positive Text Reviews					0.0419
					[0.030]
Additional Controls^					X
Observations	1475	1475	1475	1475	1475
R-squared	0.24	0.25	0.25	0.26	0.32

Robust standard errors in brackets are clustered at the state level *** p<0.01, ** p<0.05, * p<0.1

Notes: Each column is an OLS regression where the dependent variable is the log of the price. Each column includes controls for state. ^Column 5 includes controls for race, age, height, weight, top, bottom, versatile, whether the escort allowed himself to be reviewed, body type, body hair, if the escort advertised safer sex, eye color, and whether the escort preferred phone contact.

Appendix Table III
Decomposition of Picture Premium for All Picture Types

	(1)	(2)	(3)	(4)
No. of Face Pictures	0.0295***	0.0303***	0.0288***	0.111***
	[0.0057]	[0.0056]	[0.0058]	[0.033]
(No. of Face Pictures)^2				-0.0170***
				[0.0059]
(No. of Face Pictures)^3				0.000837***
				[0.00029]
No. of Body Only Pictures	-0.0041	-0.00382	-0.00522	-0.0258*
	[0.0034]	[0.0035]	[0.0038]	[0.015]
(No. of Body Only Pictures)^2				0.00658
				[0.0049]
(No. of Body Only Pictures)^3				-0.000433
				[0.00038]
No. of Non-Face, Non-Nude Pictures		0.00379	0.00161	-0.0139
		[0.0037]	[0.0035]	[0.021]
(No. of Non-Face, Non-Nude Pictures)^2				0.00551
				[0.0059]
(No. of Non-Face, Non-Nude Pictures)^3				-0.00027
				[0.00037]
Log of No. of Reviews			-0.01	-0.0078
			[0.010]	[0.0098]
Log of No. of Text Reviews			0.0935***	0.0946***
			[0.014]	[0.014]
Additional Controls^	X	X	X	X
Observations	1475	1475	1475	1475
R-squared	0.27	0.27	0.28	0.31

Robust standard errors in brackets are clustered at the state level *** p<0.01, ** p<0.05, * p<0.1

Notes:
Each column is an OLS regression where the dependent variable is the log of the price.
^Each column includes controls for race, age, height, weight, state, top, bottom, versatile, whether the escort allowed himself to be reviewed, body type, body hair, whether the escort advertised safer sex, eye color, and whether the escort preferred phone contact.

Appendix Table IV
Comparison of Male Escort Websites

Panel A: Large Cities

	Gay Concentration:		Number of Escorts:		
City	Rank	Index	Our Data	Comp 1	Comp 2
San Francisco, CA	1	4.95	316	75	78
Washington, DC	2	2.68	275	72	29
Los Angeles, CA	6	2.11	535	194	119
Atlanta, GA	7	1.96	290	45	68
Boston, MA	9	1.67	110	68	35
New York City, NY	13	1.49	645	376	173
Miami, FL	14	1.46	321	80	60
Chicago, IL	18	1.31	241	56	59

Panel B: Sample of Smaller Cities

	Gay Concentration:		Number of Escorts:			Our Data /	Comp 1 /
City	Rank	Index	Our Data	Comp 1	Comp 2	Comp 1	Our Data
Austin, TX	3	2.44	26	3	15	2 / 3	2 / 26
Seattle, WA	5	2.21	33	14	23	11 / 14	11 / 33
Sacramento, CA	8	1.71	17	7	5	5 / 7	5 / 17
Minneapolis, MN	10	1.61	33	2	15	2 / 2	2 / 33
Denver, CO	12	1.53	41	5	19	5 / 5	5 / 41
Portland, OR	15	1.45	15	1	12	1 / 1	1 / 15
Indianapolis, IN	19	1.12	19	0	5	---	---
Tampa, FL	24	1.05	47	15	22	11 / 15	11 / 47
Kansas City, MO	25	1.04	9	1	7	0 / 1	0 / 9
Columbus, OH	27	0.99	30	3	13	3 / 3	3 / 30
Rochester, NY	29	0.89	4	0	0	---	---
Albany, NY	31	0.85	5	0	3	---	---
Nashville, TN	32	0.85	14	1	8	1 / 1	1 / 14
Oklahoma City, OK	34	0.83	3	1	0	1 / 1	1 / 3
St. Louis, MO	37	0.69	18	3	6	2 / 3	2 / 18
Detroit, MI	42	0.6	73	10	14	9 / 10	9 / 73
Charlotte, NC	45	0.49	19	3	4	2 / 3	2 / 19
Buffalo, NY	49	0.35	5	0	0	---	---
Total			411	69	171	55 / 69	55 / 378

Notes: Comp 1 = Competitor 1, Comp 2 = Competitor 2.
Accessed on 1/25/09. Counts of number of unique escort advertisements (Panel A). Counts of number of escorts by home base for our data (Panel B). Gay concentration is the fraction of the MSA identified as same-sex male partners in the 1990 Census divided by the national average. See Black, Sanders, and Taylor (2007) for futher details. The last two columns in Panel B show the number of escorts listed in our data source who could be identified on Competitor 1 and the number of escorts listed on Competitor 1 who could be identified in our data source, respectively. Cities in the bottom panel were selected at random from the fifty cities listed in Black, Sanders, and Taylor (2007).