The Meat Market:
A philosophical inquiry into the nature of the economics of dating and relationships

T.J. Rakitan

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Abstract

This paper deals with the economics of dating and relationships as an extension of the ideas that drive market-based interaction. Several microeconomic frameworks are explored, and theories are applied to issues surrounding the social phenomenon commonly referred to as dating in an attempt to tease out whether or not economic reasoning can explain such phenomena. Specifically, it is theorized that an analysis of the market for dating constitutes an extension of the basic market for labor.

Introduction

There is nothing rational about romance, is there? Acquaintance, friendship and love are anything but subject the cold, unfeeling laws of reason, supply and demand, are they not? Reason alone cannot explain why an acquaintance of mine spent six months pining over an ex-significant other instead of simply "moving on," right? This paper argues just the opposite: romance, dating and courtship—all non-marital—are all subject to a market structure, complete with real incentives, known payoffs and rational action by rational actors. Several market-based frameworks will be examined, and an analysis of each model's descriptive, explanatory and diagnostic capability with respect to the market for dating and relationships will be explored.

It seems to be a commonly held conception that human social interaction is governed by decidedly irrational action; it need not always have a purpose, nor do its agents need to think very hard about its costs and benefits. The lack of a common opinion of the nature of romance makes it equally hard to qualify as to quantify. From the lyrics of popular songs to the poetry of Walt Whitman, nobody seems to be able to agree on exactly what drives the feelings associated with the idealized picture of the romance—attraction, desire, etc.—and the subject is often left mysterious and up to personal interpretation. However, several ideas have led me to question the conventional wisdom that reactions to these feelings are truly irrational: it cannot explain social promotion, by which I mean the notion of seducing one's way toward fulfilling a goal; its results, while not easily quantifiable, seem to me to be more susceptible to the influence of pre-existing propensities and predilections rather than of completely exogenous factors; it is often associated with the concept of happiness—measured in Bentham's hedons or otherwise—and as such is not out of keeping with basic definitions of utility; economics in general, as a discipline, often takes into account such nebulous and intangible variables anyway (for example, how *does* one measure utility?).

Finding a way to effectively interpolate these qualitative differences, however, falls far beyond the scope of abstract economic reasoning. Of course, if biologists were to suddenly discover the biochemical, physiological reasoning behind human reactions—and were then to coordinate with psychologists and sociologists to fully assign values to this chemistry such that a human's reaction to a qualitative situation could be quantified—specifying these reactions as parameters would be much easier. With apologies to Isaac Asimov, however, this is sadly not the case. Nevertheless, the human mind is fully capable of undertaking the qualitative calculus of decision-making when no quantitative variables present themselves. To illustrate this, the reader might make a list of associates and acquaintances and subsequently ponder which members of this list, if any, make decisions solely on the basis of quantitative data. To act thusly would be absurd: quantitative analysis, in practice, is not always possible—for example, what if one must decide between similar outcomes for which there are no measurable payoffs? What if payoffs themselves would not be homogenous even if they could be measured? As we shall see, it is this very capacity for qualitative reasoning, which we will assume to be implicit to rationality, that allows us to choose among options that are otherwise of quantitatively equal value.

The remainder of this paper is organized as follows: we begin with a discussion of relevant literature and from there we proceed into a discussion of time as a factor of opportunity cost. We subsequently construct our basic framework. From this we derive the overarching market structure of our model, with comparisons to a labor market. Following, we discuss actions within the market, examining first matching outcomes and preferences abstractly via search theoretic models and subsequently examining real-world behaviors through a game-theoretic lens. The final section concludes.

Relevant Literature—not your typical romance

The definitive work cited regarding the economics of social relationships is Gary S. Becker's *A Theory of Marriage* (1973). Becker's premise, much like my own, was that marital relationships are subject to rational thinking and utility-maximizing behaviors. Most notably, Becker's simplifying assumptions—while only somewhat heroic—are predicated upon the notion that people seek mates if and only if they are made better off. The marriage market is in equilibrium for Becker; from this assumption he derives many of the implications he describes. Specifying the supply and demand schedules, for example, he plots a relationship between relative incomes of possible mates and the quantity of mates of a certain type available for marriage. The result of a marriage is the formation of a household, and every household has a production function that depends upon facets of household capital: market goods and services; time inputs of the various household members; and "environmental" variables (Becker 816-7). Incentives to marry under Becker's model include optimization of combined incomes, optimal division of time between household and non-household activities for both spouses and the benefits from complementary or substitutable traits between partners as determined by market forces. From this latter facet Becker derives a determining parameter for assortative mating.

Unlike Becker, however, I am exploring non-marital relationships. These necessarily have different entry and exit costs than marriage: no "household" is necessarily formed for any extended period; rather, relationships exist in the shorter-term in the manner of independent contracts, likening the market for dating to a market for labor. Along this line of inquiry, search-theoretic explorations of the labor framework have appeared at length since Gale and Shapley's (1962) solution to the so-called "stable marriage problem," in which the challenge lies in finding optimal, stable pairings between *n* men and *n* women with homogenous preferences. However, the Gale-Shapley algorithm and its applications are designed around time as a discreet variable and implicitly assume zero dependence upon actual waiting times. As we shall see, time in and of itself can be considered an expense in the real world; that is to say, one cannot reasonably be kept waiting forever. The wait time, as opportunity cost, must be factored into the model.

Burdett and Coles (1999) directly liken the marriage market to a market for labor, treating both as "long-term partnership formation." Taking into account possible frictions in the market—search costs—they proceed to build a two-sided search model subject to both a market and a Nash equilibrium. Factoring in time as a continuous variable and a search cost, they discuss the incentive to join a partnership by comparison of utility gained to the reservation utility of remaining single. Utility here is non-transferable, implying that each side must bear for itself the cost of the search. Adachi (2003) builds on this idea, creating a two-sided search model under the assumptions of random sequential pairings and existing search frictions. He concludes that, as search frictions approach zero, the Gale-Shapley algorithm becomes a better and better predictor of stable matchings. This is explicable in the intuitive sense by the idea that lower search costs yield greater relative returns to search, and the searcher is more likely to continue searching until his optimal matching is achieved.

In the scope of the Burdett and Coles model as well as Adachi's, all possible "frictions" in search are accounted for as search costs. However, I propose to distinguish between the terms "friction" and "cost": while the term cost connotes some value that is subtracted from the benefits of an outcome—thus lowering net benefit—the term friction might connote a slightly better approximation of our results in that it need not be quantifiable. Specifically, higher search friction may lead an actor to accept a non-optimal pairing instead of seeking out his best preferred match due to the some perceived marginal cost of searching outweighing the marginal benefit from the extra search effort. However, from a strictly cost-benefit point of view, such a match would indeed be optimal, even if it were not a Pareto-optimal pairing.[1] Hence, we will think of friction as something other than cost in the traditional sense and within the search framework it becomes a constraint preventing the achievement of optimal outcomes. The Pareto-

[1] For example of matched pairing framework, see Section "Preferential matching"

optimality, however, is only one consideration in the face of the greater labor market framework within which the Burdett and Coles (1999) model operates given that an optimal assortative match need ultimately make both actors as well off as possible in the complete sense—if one actor finds an available better match, the assortative mating assumption predicts that he will go for it. From this we may infer that an optimal matched-preferences outcome under homogenous preferences is also Pareto-optimal.

Adachi's (2003) further findings include a certain selectivity bias. As agents of each sex become more selective in their preferences, agents of the opposite sex lose out —that is, they become less selective (e.g. the "I'll take what I can get" mindset) and will often have to settle for someone below their ranked-match of maximized utility. Gale and Shapley (1962) arrive at the same conclusion in a different light: optimality is gained by way of a first-mover advantage such that the agents of one side land the date of their choice, whether or not said date's own utility is maximized. Nevertheless, this is still Pareto-optimal, owing to the fact that any change in the outcome would make the date happier at the expense of the first mover.

Hortaçsu, Hitsch and Ariely (2006) carry Adachi's framework into the real world in an empirical analysis of online dating. The online medium was chosen for its low search costs and its capacity for listing revealed as opposed to stated preferences. Specifically, matchings can be suggested by a computer matchmaker, or participants can browse at leisure through what is essentially a database of others' preference information at a lower time-cost than a conversation or a physical meeting. It is also hypothesized that the anonymity of the online medium constitutes a further reduction in search friction; holding all else constant, it is found that Adachi's (2003) hypothesis concerning the accuracy of the Gale-Shapley algorithm under reduced search frictions appears to hold true: the lower the friction, the better the Gale-Shapley algorithm is able to predict stable outcomes.

Another factor discussed in search models dealing more directly with labor is the concept of mobility. That is, in the actual labor market a worker might be able to choose between various jobs to find the employer that best matches his or her preferences. Keith and McWilliams' *The Returns to Mobility and Job Search by Gender* (1999) deals with the value of mobility to the worker in terms of potential gains from search and the resulting intensity of the search process. The worker, following the incentive of finding a better job by search, will be motivated to undertake a more extensive and intensive search if there are greater gains to be had by doing so—that is to say, if the worker is not currently in his or her matched-preference optimal job—and as a result "the arrival rate of alternative job offers" (Keith and McWilliams 461) is directly dependent upon search intensity. In this framework, of course, opportunity cost is easily measured in terms of foregone wages. However, Keith and McWilliams' (1999) study observes returns to mobility by gender holding constant the reason for searching and finds that, across both genders, returns are greater for voluntary mobility. For our purposes, we are not able to take into account the wage-time differences between mates, but neither does it seem unreasonable to infer that some qualitative difference might be the real motive to switch in a real-world labor setting. As another way to look at Keith and McWilliams' (1999) premise, let us posit a worker involved in employed search. She may be seeking to move upward along the supply curve; she may be informing herself about her value in the job market, better enabling her to maximize her wage by way of bargaining or changing jobs.

Likewise, if non-marital romantic relationships can be thought of as parallel to employment, one may seek to change the quality of his or her relationship by way of searching for a better one even if such a difference cannot be measured by a wage *per se*. Let us think of the wage associated with a given job as one of many qualities of that job. From this point of view, a higher wage can be thought of as a single facet among several that would give a worker reason to take a new job and leave his old one. Again, the assumption of rationality predicts that no worker in his right mind would voluntarily give up his job for one that he felt would make him worse off.

An early counterpoint is worth addressing here: it is not uncommon in the real world to observe otherwise rational people remaining in social relationships that can be characterized as loss-minimizing rather than profit-maximizing.[2] As outside observers might see the actors' net payoffs as negative somehow, this necessarily begs the question of why the relationship continues.[3] We will explore these non-optimal equilibrium scenarios in the discussion of the limitations of our analysis.

<u>Time</u>

Time is the ultimate sunk cost. It is measured in standardized units that pass for absolutes; that is to say, it cannot be counted as positive or negative—it simply is computed in terms of metaphysical distances and amounts. Once used—or rather, once an action is measured in time—time cannot be recouped. Regardless of the mechanisms that drive time, actors in economic markets first and foremost must deal with the use of

[2] The distinction is one of connotation: loss-minimizing connotes that a firm or actor is experiencing negative profits and seeks to "cut its losses" while profit-maximizing connotes that economic profits $\pi \geq 0$.
[3] I feel it safe in this case to default to the anecdotal wisdom that everyone has known someone who has failed to leave a relationship when it was repeatedly pointed out that the possibility of some other stable pairing of higher utility existed.

this as their primary resource. In its many denominations, it is the single most homogeneous unit of measure in the market.

Were we to imagine time as a continuum along which we could only travel in one direction, we could take any given action and map it out over the amount of time it would take to perform. This, in economic terms, is necessarily an opportunity cost. Notions of multitasking aside, it is in reality difficult for any one person to truly perform two discreet actions at the same time. One could, for example, set two objects in motion by way of exerting physical force on them, but this can only be considered as two separate actions if we take the perspective of the objects being set in motion. From the point of view of the actor, it is one motion that at best takes a relatively short amount of time to perform. Note, further, the use of the word "relatively": the time expended to perform any action or series of actions need not be treated as an absolute; rather, it must be viewed in contrast to some other expenditure of time—either time spent performing a similar action (or even the same action, if there is enough precision to obviate the greater differences) or an altogether different one for which the payoff value of the time is known—in order to see the expense as a price or a wage.

Time as a measure of price of an action can be thought of as the largest amount of time that any actor is willing to spend performing that action before he would stop performing it of his own accord. Some actions, of course, will require literally no more time than they have to, meaning that any actor is willing to perform the action until it can no longer be performed continuously—for example, starting a machine (or some other such action with a definite end). For these actions, of course, no market can be derived: the expenditure of time is determined directly by the natural duration of the action, such that no actor finds it reasonably within his power to change the amount of time he can spend performing that action.

Besides measuring the duration of actions, however, time has other uses, some of which might be said to be subject to market forces. These uses of time must necessarily involve utility, as any action might upon which an actor might spend his time, and, most importantly, there must be some secondary value associated with this use of time. In our terms, this value could be called a wage if the actor were receiving payment for performing an action or a series of actions over time, or a price if the actor is paying for a market good or service to which to apply his time. Our purposes here, however, deal with time that has no direct monetary value. A qualitative value placed on time must be referred to in non-money terms; ergo, we will rely on man's capacity for qualitative calculation in assigning some value to non-wage time. We derive it from ordinal ranking, which, as we will conclude, entreats of nothing short of the concept of utility itself.

A simple one-sided search model based on time and preferences

Becker's (1973) analysis uses income as the variable to be optimized in the function of the household payoff *Z*, ostensibly building on the premise that higher incomes are readily translatable into higher quantity values of market goods that can be consumed, and that no raw good or service purchased is utility-giving simply by virtue of the fact that it has been purchased. Rather, any consumer must not only have the capital with which to purchase a good or service, but he or she must also be able to apply his or her time to consuming the good or service in order to gain utility. Ergo, the attractiveness of a potential mate should be based on his or her ability to participate in other markets and still have the time to effectively consume all goods and services purchased, so the higher the income—and thereby the ability to gather household capital—the better. However, no household need be formed in the dating market, so some other parameter is needed.

For our purposes, we assume that our actors can and do rank their actions in order of preference. These preferred actions might be the subject of a one-sided search model in which each actor is given a series of discreet periods of time within which time is continuous. In any given period, each actor chooses and performs the action that makes him the best off (determined by his ranked preferences) that he can feasibly perform. However, determining the preferred action to perform necessarily begs the question of how value might be allotted to the action; that is, *why* is any action preferred to another?

To illustrate an answer, consider two similar actions that can be accomplished in the same amount of time. Our assumptions dictate that the preferred action will be whichever one yields greater utility. Dividing utility U by time t, we derive a theoretical rate of utility $\mu = U/t$. We will refer to this parameter as the utility rate as measured by the ordinal opportunity cost of time.

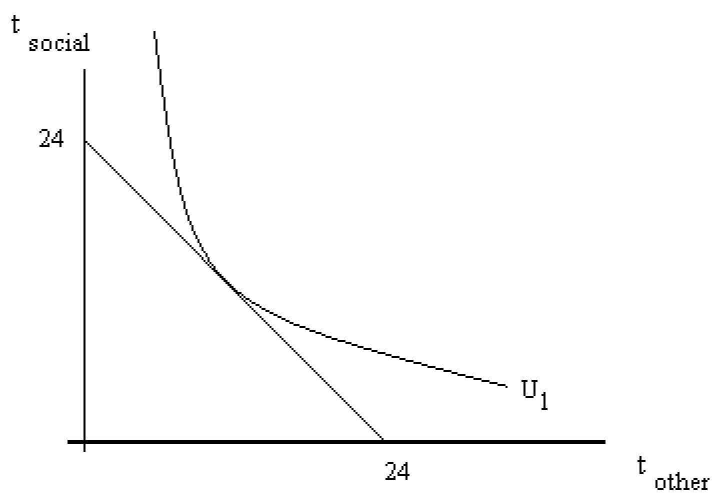
Basic framework: working time in the market for labor

As with standard economic frameworks, this one is predicated upon the assumption that all actors in the market are rational and utility-maximizing, and that their tastes and preferences can be modeled by means of an indifference map. By changing the price and measuring the varying reactions of any one actor to a change in the budget constraint—i.e., a change in the price of the good we wish to study—we would be able to derive a demand curve. In our case, that good is time spent with a (potential) "significant other."

In social scenarios we may choose among many different ways of how to spend our time; these may include (but certainly cannot be limited to) working, studying, eating, sleeping or engaging in some form of leisure activity. There is a one-for-one trade-off between time spent one way and time spent another; opportunity cost may be constructed based upon the relative values placed upon how time is spent.

For our purposes, let us specify t_{social}, time spent in the social arena—the "dating scene" or simply with a "significant other"—on the vertical axis, and t_{other}, time spent not dating on the horizontal axis.[4] This is somewhat complicated by the fact that there is a 1:1 correspondence between time one can spend socializing and time one can spend not socializing.

<u>Fig. 1: Time trade-off</u>



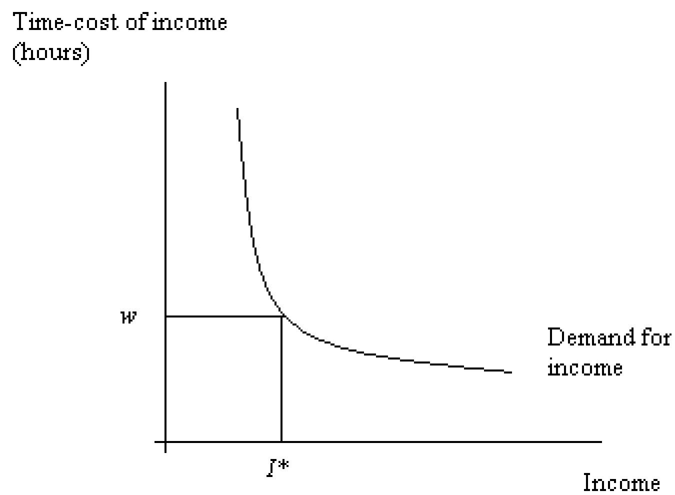
[4] The distinction might also be made that socializing or spending time with a "significant other" could be considered a condition rather than an action *per se*, and therefore does not preclude the possibility that one might derive utility from a date that also served some other purpose—such as the collegiate concept of the "study date." To clarify our distinction between "social" and "other" ways to spend one's time, these two parameters might also be thought of as representing "non-single" as opposed to "single," respectively.

Despite the measured one-to-one correspondence of time, however, certain qualitative factors may change the perceived value of any unit of time spent in a given condition or performing a certain action. General examples include the market for labor: in neoclassical labor theory, working time as a function of demand for income. Contensou and Vranceanu (2002) arrive at an observable time-price of an income unit from which to derive such demand: given an hourly wage rate of *w*, the price to the worker—an effort cost, let us call it—for each unit of income is $p = 1/w$. The income-effort trade-off is the demand for income, and equilibrium is determined by measuring the marginal utility of income against the marginal disutility of work: the one must exactly balance the other. Equilibrium income demanded I_E is earned by working for a number of hours, derived by dividing equilibrium income over the wage rate per hour. Substituting p for $1/w$, we find that $h = pI_E$. For any individual, then, the supply of working time is:

$$h^s(p) = pI(p)$$

where h^s is the number of hours to work, I is income, and p is the time-price or effort cost. Income itself can be represented for any given worker as the multiplicative relationship between the worker's wage-rate and his labor time. In general, then, the demand for income is a trade-off between the time-price of earning the income and the income itself. Necessarily, a lower time-cost of income for any worker is associated with a higher overall income, as in Fig. 2, below.

Fig. 2: Demand for Income

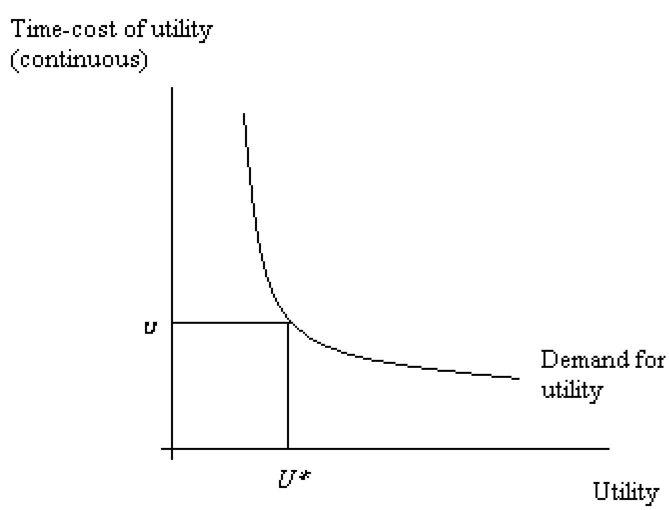


Likewise, relationships require inputs of time—and they must be optimal in a functioning relationship. Of course, no wage rate can be measured here with which to compute an effort cost or income itself, but ordinal values of ways to spend time may be used as a proxy, even within a labor framework. Consider: given the option between two jobs of equal pay, what incentive might sway a worker's decision toward one or the other? It would not seem unreasonable that change in non-observable factors, *ceteris paribus*, might mean the difference between taking the job and leaving it. Is it too unreasonable to posit that such qualitative factors might drive one's decision to engage in activity with a (short-term) mate?

In common observation, those of us in relationships are distinguished from those of us who are not in relationships via differences in time spent with a "significant other." Obviously, this time has some form of value to those involved, impossible as it is to quantify. In terms of ordinal rankings, however, this time must have a preferential subjective value that ranks it above time spent doing something that does not involve the "significant other." Necessarily, this choice is subject to a one-sided parameter of search. As we have assumed that any agent will only do what makes him or her better off than not, let us use μ, the utility derived per unit of time—or the utility rate from our simple one-sided search model—as a proxy.[5] If, in the same amount of time as some alternate action, any other action yields greater utility, then this action will be preferred to the alternative.

Substituting the utility rate for a wage rate, our opportunity cost in terms of time p' can be defined as $p' = 1/\mu$. Modifying our demand parameters appropriately, the demand curve for the resulting "ordinal income"—utility, for all intents and purposes—represents the trade-off between time-cost of committing to the relationship and the utility of spending time in the relationship.[6] Both the time-cost of utility and utility itself may be thought of as continuous, as in Fig. 3.

Fig.3: demand for relationship utility



[5] In Becker's (1973) analysis, μ is used as the "shadow" price of time at optimum household output Z. For our purposes, the symbol will stand instead for the subjective ranking given by an actor to any action or condition he will undertake.

[6] We can get away with an analysis like this on account of the fact that this is a theoretical framework, nothing more. Furthermore, here utility is based upon ordinal ranking along a continuous range of values.

Intuitively, this implies that lower time-costs would generally be associated with higher levels of utility for any given input of time. Conversely, if the total level of utility $U = \mu t$, then $\mu = U/t$ as in our one-sided model, meaning that for any given level of utility an increase in the amount of time spent decreases the utility rate. The supply of utility determines the utility level in the Fig. 1 trade-off between t_{social} and t_{other}.

Love's Labors

From the point of view of the employer in the more general labor market framework, the demand for hours worked is a function of the wage rate—which, of course, should reflect willingness to pay for standardized time on the job (Contensou & Vranceanu §4). The supply of hours worked is backward bending,[7] which is reflective of the concave shape of the demand for income in the neoclassical model. Again, as the wage rate increases, the time-cost of each unit of income decreases, allowing the worker to begin to substitute non-work time (leisure time) for work time, thus deriving utility from his uses of his free time as well as his income.

Within the framework of the dating market, however, this is far more difficult to see. Even if we were to replace wage with some utility rate μ, it would stand neither to common appetitive logic[8] (or, appealing to the appetite or other basic drives) nor to general observation that the supply of time toward a relationship would arc back toward zero as the utility rate increased as in the special case of the backward-bending labor market supply curve. With obstruction in mind, let us question the concept of a wage rate. What is it? Ideally, a wage is compensation for the disutility of work, also

[7] It should be made clear, however, that the idea of the backward-bending supply curve for labor time is seen as a special case; we will also treat it as such.
[8] The term "appetitive" is attributed to Plato. Reference unknown.

measurable as an opportunity cost. In economic terms, a wage must necessarily meet or exceed the opportunity cost to the worker of performing his job. For example, if a worker finds the opportunity to increase his wage rate, why wouldn't he? Along the same lines, the opportunity cost of switching jobs will include the worker's old income, the friends he might have had at his old job, the benefits package that he had, etc.—and whatever else he gets in his new job must necessarily be more attractive to him in order to make the switch worth his while.

Translating the idea, the opportunity cost of spending time in a relationship must include all that the involved parties are not doing.[9] Unless the relationship were to become the be-all and end-all of existence for actors in the dating market—at which point they would likely leave the market by getting married anyway—other uses of time must exist from which to derive utility. Therefore, as opportunity cost of the relationship rises, any given utility rate is marginally less able to compensate, and a market agent may be inclined to substitute utility from other actions for utility gained from time in the relationship. Ergo, we would expect the same substitution effect as we see in the special-case supply curve of hours of labor to occur when generalized opportunity cost based on ordinal ranking of the uses of one's time is used in place of a wage.

Let us posit an intuitive example from casual empiricism: at a small, liberal-arts college, the student body's main interest is very likely to be academic in nature. The "wage rate"—for us, opportunity cost—of entering a relationship increases along with our relationship qualifier of time spent with a significant other. As the opportunity cost of this time increases, we would expect that students would withdraw from relationship

[9] Additionally, this opportunity cost must also consider both agents' reservation utilities from remaining single; see "Search framework and preferential matching."

activity or from the greater "dating scene" and refocus their energies on their other, academic priorities and responsibilities. Granted, while some might hold this assumption to be true for *all* universities, there are those who would posit, conversely, that many students also hope specifically to meet their "other half" at college. This difference in strategy need not bother us: any actor who does hope to meet his or her "other half" at college would necessarily have to opt to participate in the dating market anyway as a precursor to finding said "other half." Furthermore, any actor falling within this archetypal paradigm will still have to engage in a search process, complete with associated search costs and other frictions—not to mention that, in a university setting at least, any actor that fails to meet his or her fixed costs (such as maintaining a given grade point average) will be forcibly removed from the market, meaning that his or her ultimate returns to continued search within the university context are rendered moot.

Search framework and preferential matching

Various works, including Becker (1973), Gale and Shapley (1962) and Cigno (1990) present a "simple marriage game" designed to illustrate assortative matching with the assumption of homogeneous preferences. For any man M_n, let *n* be his ordinal ranking in the eyes of any woman F_n, and let *n* be her ranking in the eyes of man M_n: 1 = most desirable; 2 = next most desirable; and so on. Let us call the payoff $Z_{n,n}$. Matching occurs in discreet periods, with each actor approaching the most attractive member of the opposite sex in the first period and completes the pairing if and only if neither actor has no better available option. This process repeats until all are paired. We assume for now that no actor can pair with more than one other actor in each period. Consider the following payoff matrix:

Table 1

	F_1	F_2	F_3
M_1	$Z_{1,1}$	$Z_{1,2}$	$Z_{1,3}$
M_2	$Z_{2,1}$	$Z_{2,2}$	$Z_{2,3}$
M_3	$Z_{3,1}$	$Z_{3,2}$	$Z_{3,3}$

In any period, each actor will pair with the most attractive actor that has not already been paired; therefore, if M_3 approaches F_1 in the first period, he will find that she will pair with M_1 as her best available option. The above matrix implicitly assumes homogeneity of preferences, as evidenced by the ordinal ranking of all the players. For such ranking to occur, all F_n would have to agree that M_1 were more attractive than M_2, etc., and all M_n would have to agree that F_1 were more attractive than F_2, etc. Optimally, stable matchings occur at the core of the matrix, considering that no actor will settle for less of a match than he or she has to. Were M_1 to pair with F_1, as the game predicts he will, neither could be made any better off in an alternate matching. Likewise, while M_2 would be happier with F_1 than with F_2, F_2 is happier with M_1 and will not compromise her utility. Therefore, M_2's next best option is F_2. Likewise, she feels that she would be better off were she able to pair with M_1, but M_1 prefers F_1 to F_2, so F_2 can do no better than to pair with M_2 no matter the case.

Now let us introduce a twist: we will re-specify our ordinal rankings using theoretical levels of utility in the manner of our labor market framework. Assuming homogeneity of preferences, we may posit that each actor's traits enable him or her to offer a certain rate of utility μ to any other actor. For any period of interaction, then, a higher utility rate is more desirable. We will initially assume that search is frictionless; the basic criteria for a matched pairing will only include the utility rate and some reservation utility x, which is the minimum amount of utility per period needed for any agent to commit to a relationship. With four actors, consider the following payoff matrix:

Table 2

	F_1	F_2	F_3	F_4
M_1	$Z_{1,1}$	$Z_{1,2}$	$Z_{1,3}$	$Z_{1,4}$
M_2	$Z_{2,1}$	$Z_{2,2}$	$Z_{2,3}$	$Z_{2,4}$
M_3	$Z_{3,1}$	$Z_{3,2}$	$Z_{3,3}$	$Z_{3,4}$
M_4	$Z_{4,1}$	$Z_{4,2}$	$Z_{4,3}$	$Z_{4,4}$

where $Z_{i,j} = \mu_i + \mu_j$. Matching occurs if and only if $Z_{i,j} \geq x_i$ and $Z_{i,j} \geq x_j$. If either of these conditions is not satisfied, no match occurs.

To address the subject of costs, let us introduce a discount rate of utility. A search model by Bloch and Ryder (2000) uses a standard discount rate concept denoted δ, computing the discount over discreet time periods as δ^T, where T is the discreet time period. Costs of future search several periods into the future can be considered discounted utility. As the time period approaches infinity, then, the discount rate will approach zero. Applying this same concept, we would infer that expected future returns to search diminish over time. Bloch and Ryder (2000) conclude that paying the discounted value of search costs for the next period as a flat fee to a matchmaker is an easier way to reap the benefits of search without incurring losses of utility over future search periods. For our purposes, we will borrow the idea that, within each period of search some utility is lost from not pairing with the first agent of the opposite sex met during search; we also subtract further a certain disutility from having to bother with the search process. Assuming a homogeneous search cost c, then, $Z_{i,j} = (\mu_i - c) + (\mu_j - c)$. Again, matching will occur if and only if $Z_{i,j} \geq x_i$ and $Z_{i,j} \geq x_j$.

Limitations: we can't explain everything

While the tools of economics as a discipline are powerful and far-reaching, they cannot explain everything. Market interactions, for example, are group phenomena in which many individuals are constituents. While detailed analysis can gauge the collective movements of these populations in a market setting, individual actions and single transactions between agents cannot be accounted for in terms of motivation. Even the ideas of supply and demand are based on the starting assumption that market agents seek to consume goods and services in the first place and that they are willing to pay a certain price—that ideally reflects opportunity cost—to acquire the good or service for consumption. With that said, we now discuss a few significant limitations of our analysis.

Casual how-to literature regarding romance and dating is often rife with suggestions of entry and exit criteria (internet advice columns come to mind) for social relationships. Conversational gossip has also be known to touch upon the same subject; outside observers often wonder at why relationships continue when they are clearly dysfunctional and non-optimal. Of course, this is as much a matter of perception as it is a matter of asymmetric information: outsiders' interpretations—while a function of their own perceptions, tastes and preferences—are based upon a point of view distinct from that of the observed parties. For example, if an observer analyzes two parties remaining in a relationship that she perceives to be non-optimal, she must have evidence that one or both of the parties would be better off if the relationship were over. This information asymmetry may take the form of a general sense on the observer's part that there are other available actors with whom those in the dysfunctional relationship may pair that would make all of them better off, or the observer may perceive that the costs incurred by maintaining the relationship outweigh the benefits. In this latter case, surmounting barriers to exit may be less costly in the long run than maintaining the relationship.

Nevertheless, the preceding paragraph relies heavily on the vantage point of some external "observer" figure. This is a crippling limitation in that it does not deal directly with the transacting parties. Again, any outsider might have a different perception of the costs and benefits of a given relationship than the perceptions of those involved. For this to be the case, there can necessarily be no homogeneity of preferences between the observer and the parties involved. Furthermore—and far more significant in terms of our analysis—this lack of homogeneity might be accounted for by the glaring lack of revealed payoffs. No price or wage associated with one person is available in strictly quantitative terms for comparison to other possible matches, and consequently no productivity may be computed for a preference-matched social partnership.

Conclusions and implications

The purpose of this paper has been to express the notion that generalized, incentive-based interpretations of interactions between humans—such as the concept of a labor market—can explain the social phenomenon we know as dating. In the face of the greater marriage market posited by Becker and others, of course, dating is far more akin to a job interview. It sets the stage for any number of signaling and screening scenarios to take place, as we might later explore through game-theoretic viewpoints. Within the scope of relationships themselves, however, any number of interactions can take the form of strategic scenarios—introductory game theory often talks of the "Battle of the Sexes" coordination game, and the textbook *Games of Strategy* by Dixit and Skeath (1999) uses a dating example during a discussion of brinkmanship.

Greater implications of search-theoretic frameworks include analysis of the effect of technological change on returns to search. The advent of Internet dating websites has dramatically lowered search costs: some charge a flat rate, others charge by the day. The matchmaker role occupied by these technologies takes into account preferences as specified by the users and reduces much of the opportunity cost of search by obviating the need for a single agent to physically seek out others with whom to transact. As with similar networking services, "positive spillover" externalities further increase perceived chances of one encountering one's match made in heaven—or online, as it were—by attracting an increased subscriber base from which to draw.

This work is greatly hindered by the fact that no real proxy can be thought up for utility derived from qualitative scenarios; nevertheless, the human mind's ability to perform the kinds of qualitative calculus that allows us to ordinally rank our preferences is indicative of the notion that we as market agents can recognize the incentive of greater utility. If nothing else, this manner of thinking about social interaction as similar to a labor market might serve to induce us to ponder exactly how we should best go about choosing our short-term mates.

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