MONETIZATION: A THEORY AND APPLICATIONS

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ABSTRACT

JAMES R. HULL: Monetization: A Theory and Applications
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Chapter 1 introduces the topic. In Chapter 2, I present a review of the theoretical work on monetization and money. This chapter identifies the classic schools of thought on what monetization is and combines these with recent interdisciplinary scholarship to produce a theory of monetization for the 21st Century. It is shown that this theory provides improved explanatory power and generates many more interesting avenues for further research than the current theories. The major contribution of this chapter is a new theory of monetization that builds on the work of classic sociology, economics, and anthropology. Chapter 3 extends the theoretical work of Chapter 2 to connect it with familiar sociological literatures describing exchange, social networks, and trust. It highlights the importance these factors for understanding monetization as institutional change. It compares this enhanced theoretical understanding to simpler economic models typically employed and demonstrates that the social network interpretation of monetization out-performs the simpler economic labor supply and demand explanation. Basic correlation analysis is used to support the empirical propositions, and a discussion of the unique challenges to studying monetization empirically is provided. The major conclusion of this chapter is that social network position is closely related to the degree of labor monetization among rural households in a transitional economy. Chapter 4 is unique in treating monetization as an outcome variable and exploring the basic

demographic, economic, and agricultural factors that predict this transition in a transaction common to many world economies: the exchange of agricultural labor. It uses data from Nang Rong District, Thailand to demonstrate that many of these factors are related to agricultural participation and labor monetization in opposite ways, suggesting an antagonism between labor monetization and traditional agriculture. Utilizing the longitudinal character of the data, the greater degree of monetization observed at a later time period is shown to be a response to changes in the structural parameters of the model, while declining agricultural participation is better explained by the shifting composition of the population through common demographic processes like population aging. Chapter 5 summarizes the findings, draws connections, and suggests directions for future study.

To Bill and Jane.

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INTRODUCTION TO THE DISSERTATION

ORGANIZATION

The three chapters that follow introduce and develop the formal concept of monetization, derive basic predictions about the nature of this phenomenon, and use variety of analytical strategies for evaluating these predictions. In Chapter 2, I present a review and synthesis of the theoretical work on monetization, and by necessity, a comprehensive review of the literature on money itself. I then provide two very different types of applications (Chapters 3 and 4) that each accomplish several goals. First, they illustrate empirically how researchers can begin to think more carefully about monetization and present strong cases for the value of this additional theoretical care. Second, they enumerate the methodological challenges that confront those who are interested in studying monetization itself, or in measuring and incorporating measures of monetization into models of other phenomena. Third, each of these applications makes a substantive contribution to a specific field of research: in the first case, the study of social exchange networks and their relation to the form of the exchange, and in the latter, the study of agricultural and economic change, both in the specific context of Nang Rong District, Northeast Thailand. In this introduction, I outline the significance of each work, the relationship of each chapter to the others, and the place of each chapter in the broader

organizational structure of academic research. But, first, a brief introduction to the general topic is in order.

INTRODUCTION TO THE TOPIC

Monetization, and money itself, share the dubious distinction of being concepts that engender a false sense of familiarity. Perhaps it is because of antiquity of the initial "transition from barter to money" in the highly developed social contexts inhabited by most professional researchers, or perhaps because of the ubiquity of money in such a context, but such speculation is quite limited in the present work. Instead, in the papers that follow I confine myself to the immediate, and considerable, implications of taking excessive liberties with concepts that should be central to sociology, as well as economics, anthropology, and other disciplines. Therefore, one common thread among these three stand-alone articles is the attempt to avoid a similarly cavalier treatment of the concept. Rather than presuming a shared understanding of what money is, and what it means for something or someone to experience "monetization," I devote as much attention as space allows to explicitly conceptualizing both terms. And while far from a complete treatment, it is my hope that the reader will be satisfied with the theoretical and empirical progress that result.

It is fair to say that up until now, two general opinions have existed regarding the study of monetization. The first, prevalent in the economic literature, is that this subject was thoroughly dealt with a century ago and is now at best a curious little branch of historical economics. The second view, more common in sociology and anthropology, is that something called monetization continues to occur all over the globe up to the present day, and that it likely has implications for many of the most central subjects in these

disciplines: modernization, commercialization, Westernization, development, mechanization, and on and on. Connections to myriad other more specialized sociological subjects are frequently implied as well.

The existence of two such widely divergent views, even in to disciplines that regularly disagree theoretically and methodologically, is a curiosity in its own right. But, given the enormous research potential suggested by this second view, one would expect to find considerable theoretical and empirical work directed at understanding monetization – what it is, what causes it, what it causes, and what its implications are from a variety of perspectives. And yet, in hundreds of published articles that relate monetization to one or another topic, not one devotes space to defining, discussing, or elaborating on the conceptual meaning of monetization. I do not fault the authors of these articles, for it is also clear that none were written with the explicit goal of improving understanding of monetization. Instead, the implication of this pattern of treatment is that all of the diverse subjects related to monetization might be relatable in intriguing new theoretical ways, and understandings of each improved, if understanding of monetization itself were a significant goal of at least a few sociological writers.

SIGNIFICANCE AND CONTRIBUTIONS OF EACH CHAPTER

Chapter 2 is entitled "The Sociological Significance of Monetization and Money." It addresses the first problem of theory-building: conceptualization. Before statements can be made about what monetization does, how it works, and what it relates to, the question of what monetization *is* requires an answer. A major argument advanced in this paper is that the traditional approach to money used in economics (and, by implication in sociology) draws attention away from the social character of all economic exchange,

focusing on the technology of money rather than on the social institutions and network structures that exist and regulate its use. Among early sociological writers, Karl Marx and Georg Simmel devoted considerable theoretical attention to what Marx called the "riddle" of money. But for reasons that can be explored only briefly in the chapter, these theoretical treatments failed to inspire a field of empirical study of money from a sociological perspective. I argue that this is a major loss to the discipline, and attempt to provide a theory of money and monetization for the 21st Century that might better support such empirical investigations. This revised theory incorporates core elements of Simmel and Marx, but also synthesizes theoretical insights scattered in other disciplines to provide a comprehensive, interdisciplinary theory of monetization that outperforms conventional treatments on several measures.

Chapter 3 is entitled "Social Networks and Monetized Labor." It builds on the work of chapter 2 extending it further to connect up with more familiar sociological literatures describing exchange, social networks, and trust. The result is a set of testable, if simple, hypotheses about the most prominent characteristics of social exchange networks associated with monetized and non-monetized exchange. Chapters 3 highlights the importance of social networks, information, and trust for understanding monetization as institutional change and again compares this enhanced theoretical understanding to simpler economic models typically employed. Methodologically, this chapter emphasizes the usefulness of basic correlation analysis to support or refute these empirical propositions and provides a discussion of the unique challenges to studying monetization empirically. By moving to operationalize monetization in social network terms, this chapter represents an important step toward a fully grounded, empirical science of

monetization and money. But, it is acknowledged that much work remains to be done before monetization can be fully described as a shift in the structure of exchange networks and the information transmitted by these networks as it is suggested will be possible by Chapter 2.

Chapter 4 is entitled “Agricultural Participation and Labor Monetization in a Transitional Economy.” It is truly unique in treating monetization as an outcome variable and exploring the basic demographic, economic, and agricultural factors that help to predict this transition in a specific type of transaction common to many world economies: the exchange of agricultural labor. I devote considerable space in the chapter to a discussion of methodological problems that will be common in modeling the monetization of many different types of exchange. Sample selection resulting from the observational method of study is a particular concern, and one that should be considered from the earliest stages of future data collections aimed at elucidating new aspects of the monetization process. The fundamental question addressed is, within a specific context, described extensively in both Chapter 3 and Chapter 4, what factors serve to differentiate monetized-labor households from non-monetized labor households. The major result of this chapter is a pair of binary probit models estimating the influence of a wide range of household economic, demographic, and agricultural characteristics on the probability that the household will engage in agriculture and if so, whether it engages in monetized or non-monetized labor exchange. The nature of the relationship between these two outcomes is explained. The analysis uses data from Nang Rong District, Thailand to demonstrate that many of the same factors are related to agricultural participation and labor monetization in opposite ways, suggesting an antagonism of sorts between labor

monetization and traditional agriculture. Utilizing the longitudinal character of the data, the greater degree of monetization observed at a later time period is shown to be a response to changes in the structural parameters of the model, while declining agricultural participation is better explained by the shifting composition of the population through common demographic processes like population aging.

Lastly, it is important that I also address the question of what new measurement procedures and data collection initiatives are suggested by the results of these chapters, and what types of data will be required to more satisfactorily evaluate the new theory presented here. This is the principal function of the Conclusion to this dissertation, in addition to reviewing the major connections between chapters. While smaller recommendations about future directions in research are made within each chapter, it is only when the insights of all three chapters are considered together that the most useful suggestions for follow-up research emerge.

CHAPTER 2

THE SOCIOLOGICAL SIGNIFICANCE OF MONEY AND MONETIZATION

INTRODUCTION

In this paper, I present revised conceptual definitions of money and monetization which synthesize the strongest elements from Marxist and Simmelian analyses of money with contemporary scholarship. This new theoretical framework incorporates institutional and social network views of the role of money in society and the process of social change that is monetization. That such a theoretical development has utility for researchers is shown in two ways. First, I note that in current sociology, no one writes papers about the sociological significance of monetization itself; rather, authors write papers about many other topics in which monetization is recognized as somehow connected, but for reasons not fully clear, is not brought under direct scrutiny, or measured and incorporated into models. The absence of research directly addressing monetization has resulted in a disorganized state of affairs in which little agreement exists even about even the most basic conceptual issues. I suggest that one reason for this is that we lack a contemporary *sociological* theory of money, one that is easily relatable to other major subjects of sociological inquiry, as well as compatible with the research traditions of economics and anthropology, where money currently receives more attention.

A second justification for this revised theory of monetization is that it provides a simpler, more complete, and more satisfying interpretation of well-documented accounts of the transition from barter to money. I demonstrate this using the example of a German P.O.W. camp during

World War II, selected for its comparatively contemporary setting, the prospective, first-hand documentation provided about the events by an economist of the time, and its considerable reputation as a pedagogical tool in illustrating the functions and utility of money. In analyzing the significance of the account as traditionally presented and then pointing out its weaknesses, I aim to do more than just provide a better theory. I also hope to persuade more sociologists (and not just economic sociologists) to take a renewed look at money and monetization as the fully sociological concepts that they are and to consider ways to incorporate elements of monetization theory directly into their own work.

Third, I argue that this synthesis of classical sociological writing and scholarship from multiple disciplines yields a fundamentally different way of thinking about money and monetization, one that performs an important function of theory – the generation of novel research questions and new avenues for research – far better than the current, rather stagnant theoretical understanding of money. The revised theory of money and monetization presented here places social institutions and network relationships in the foreground, replacing the money instrument as the key feature that enables monetized exchange to be identified. Further, the new theory will make explicit statements about the nature of monetization that are currently absent from sociological writing on the subject, specifically, that it is best conceptualized not as discrete or continuous, but as both depending on the scale at which the phenomenon is studied. Together, these and other aspects of the theory allow monetization to be easily related to the already well-established fields of research on social networks and social exchange and suggest a number of research questions that are as old as either Marx or Simmel and yet remain unanswered today.

As noted, I begin In Section II by reviewing the ways in which these subjects are conceptualized and studied in contemporary sociology by non-specialists in order to provide a

better sense of just how important monetization is as a general subject, and at the same time to reveal how much is to be gained from a better theory of money. I turn in Section III to a formal review of economic, and classical sociological theories of money and monetization in order to ground the theory I develop later in classical sociological work and to remind contemporary sociologists of the central significance that money once occupied in the writings of the discipline. In Section IV, I introduce the various theoretical elements that contribute to a revised theory of money and monetization. Section V provides an evaluation of the new theory using one of the most well-known and best-documented cases of monetization in action, as well as an elaboration of the broader utility of the theory. Lastly, I return in Section VI to the objectives stated above and several more specific questions posed throughout the chapter to again make a broader call for the revitalization of sociological interest in monetization.

REEXAMINING MONEY AND MONETIZATION

The General Sociological Problem

Exchange is one of the oldest and most pervasive of all human activities. It is so central to the human experience that Simmel once proclaimed it to be the most unique identifying characteristic of the human "exchanging animal" (2006: 291). That oldest form of direct commodity exchange, barter, has been with humanity from time immemorial, and money, too, has been a fixture of societies since at least the time of Aristotle, who provided perhaps the first serious analysis of money (Mielke 2000). And yet even in the most market-oriented economies on Earth, a surprising number of social exchanges that could in principle involve money remain fully or partially non-monetized, or undergo monetization before our eyes, or involve considerations of a personal nature in addition to price (Zelizer 1989; Zelizer 1996). That money has not dissolved as many barriers to exchange and trade as is often thought is an interesting

observation by itself, but more interesting still from a sociological perspective is the question of *why* some types of exchange continued to be monetized while others are not. More fundamental still, questions remain about what precisely occurs when some type of exchange becomes monetized, that is, when money, whatever it is, becomes an acceptable means of payment. Under what conditions does monetary exchange emerge and flourish? Under what conditions is it extinguished? What other social phenomena are affected by the way social exchange is carried out and how? And what implications might monetary exchange have for the cultural and moral fabric of a village, state, or nation? These questions should encourage the reexamination of classic works on money from the previous century as well as the role of money in contemporary society.

Two major questions lurk continually behind the present analysis, and are better addressed sooner rather than later. First, is it really true that sociology has had so little to say about money in recent decades? And second, if so, what is the reason? The first question will take up much of the next two sections, but it should be said at the outset that what is in fact lacking are 20th Century sociological theories of what money *is* and what it *does* in society, not theories that incorporate money indirectly, of which there are many for money is ubiquitous and inherently social. On the second question, it has been suggested that the study of money was simply ceded to economics altogether during the *Methodenstreit* of the late 19th and early 20th Century (Ingham 1998; Ingham 2000). That is, as sociology and economics grew into distinct disciplines and carved out (and defended) subject domains, money became economists' turf. But this interpretation ignores the glaring fact, to be detailed below, that economic theories of money, with a few notable exceptions are themselves mostly the products of a late 19th Century understanding of the matter. As Smithin (2000), himself an economist, writes:

> The sociologists ceded the field [of money theory] to the economists (presumably on the grounds that money is pre-eminently an economic subject), but as has been shown, the prevailing tendency among the economists was to relegate the discussion of money to a very low order of priority. It would seem, however, that any unified social science worthy of the name must at some point seriously confront what has always been, and still is, one of the key social institutions in everyday life. (2000a: 7).

Here Smithin points to the problem: a lack of serious consideration of money across two major social sciences that ought to both have more to say on the subject. But he leaves unanswered the question of why. I would suggest as a common explanation for the lack of critical attention in both economics and sociology that money is a fundamental and ever-present part of the *habitus* of nearly every practicing social researcher. It is something used every day by nearly every one of us to accomplish myriad tasks, ranging from the most mundane, such as feeding ourselves, to the more significant, such as purchasing an automobile or a better education. Such observations may well have been as true in the day of Marx, Weber, and Durkheim as they are today. But perhaps because using money seems as natural as breathing air, the nature of money and what distinguishes it from other forms of value largely escapes critical attention and scrutiny. It is simply too common and vulgar to attract notice.

The great exception occurs during times of crisis, such as periods of hyperinflation or deflation, when our attention is momentarily and almost unflinchingly fixed on that thing called money, which suddenly appears strange and uncomfortably intangible. One of the most poignant and classic examples of the power that such crises have to engender fresh interest in the nature of exchange is provided by the economist R.A. Radford, who described his experience of watching monetized exchange develop right before his eyes in a German P.O.W. camp during WWII as though it were a new pastime that the men invented to pass their time in captivity (Radford 1945). Much like the tale of Robinson Crusoe keeping meticulous records of his one-man island

economy, which has served for more than a century as an example for textbooks, Radford's account has been repeated and reimagined many times by scholars attempting to gain new insight or to argue just the opposite – that the current understanding of money is more than sufficient to explain such cases. It is precisely because of the great popularity of Radford's account with scholars of money that it will be used here as well to highlight the advantages of a fully sociological theory of money and monetization. But, more generally, a science of money that is built solely on the analysis of its perversities and anomalies is still insufficient to the task of understanding the general role of money in society, a task that has only grown in magnitude over time. Thus, along with other authors who have called for renewed sociological attention to money as a subject of interest in its own right (Deflem 2003; Ingham 1998; Ingham 2000; Keister 1992; Swedberg 1997), I suggest that there is much to be gained from a theory of money and monetization for the 21st Century.

To see just what is to be gained, I will shortly present a broad review of the sociological literature discussing monetization, but to better ground this review, I first present a brief discussion of the popular understanding of the concepts of money and monetization.

Popular Understandings of Money and Monetization

Although this review focuses on the formal, scientific theories of money, it is extremely useful to begin where most people begin, researchers and non-researchers alike, with the popular understanding of what is special and unique about money and what it means for something to become *monetized*. At this most basic level, there exists a clever bit of semantic sleight-of-hand, one that is often imitated in more formal academic treatments, in which the definition of monetization is contingent on definitions of money itself. Consider the way the terms are defined in the 2002 online update to the 2nd edition of the Oxford English Dictionary (OED).

Monetization is defined by the OED as a noun corresponding to the verb *monetize*, so to discover its meaning, one must investigate the entry for *monetize* (2002a). To *monetize*, according to the OED, is to "convert to the use of money" (2002b). Slightly more information is provided for the adjective *monetized*, with the addition of the parenthetical phrase "(as opposed to barter)" (2002c). In this derivative way it becomes necessary to examine the manifold meanings of the word *money* in order to discover fully what either *monetize* or *monetized* mean. This approach, closely mimicked in the social science literature, focuses on *money* itself as the key feature distinguishing monetary transactions from non-monetary transactions. That is, to define monetization one must first define money. Having done so, identifying monetization ought to be a straightforward task, as one simply looks for the use of *money* and if it is found, then *monetization* and *monetized* exchange there is also.

Further, the meaning of money exchange is often pegged to the meaning of barter transaction, and vice versa, in what verges on tautology. This is just the approach noted above in the OED, and it is also closely followed in the social science literature on money (2002d). Most discussions of the meaning of money employ a simple rhetorical device to side-step the critical task of distinguishing money from non-money. Take the definition of *barter* provided by Kemmerer (1935) "The exchange of one commodity for another when neither commodity is money is called *barter*" (3). In this statement, money is treated as the cipher of barter, the key to its understanding. Or more recently from Shapiro (1975): "To be designated as barter exchange, the exchange would have to be mediated without the use of whatever at the time is money" (7). And again, Dobeck and Elliot (2007): "Barter is the exchange of goods or services among parties without using currency as a medium of exchange" (5).

These popular and highly standardized definitions of barter are insufficient on their own merits because each treats a separate, antonymic concept as sufficient to define the most important features of a different concept. In short, they only tell us what barter is not, and vice versa. Without an adequate definition of money, barter remains logically undefined. Returning to the OED yields this problem in its starkest form yet, "any generally accepted medium of exchange which enables a society to trade goods without the need for barter…" (2002d). What, then, is money in the popular understanding? It is any form of exchange that is not barter. And what is barter? It is any form of exchange that does not use money. To see the confusion created by allowing money and monetization to remain as popular terms rather than properly defined scientific concepts, I now consider the general pattern of usage in the sociological literature.

The Conceptual Problem

Among the benefits of a better theory of money and monetization, the one with the greatest potential to impact research throughout the discipline would be improved conceptual clarity among sociologists discussing the relationship of this phenomenon to other sociological subjects. Assessing the manner in which the concept is employed by researchers whose principal focus is not monetization provides a measure of the extent of the problem of theory underdevelopment and the ability of scholarship on monetization to reach a wider audience, while giving one a tantalizing glimpse of what is to be gained through better integration of these many and varied lines of research if the problem be resolved.

The term "monetization" has been used to describe an exceedingly wide range of phenomena operating at an equally wide range of scales in the sociology literature. To simplify the presentation I use a typology to sort current usage of the concept according to two dimensions: 1.) whether the phenomenon is conceptualized as discrete or continuous, and 2.)

whether it is conceptualized at a macro or micro level. The result is a two-by-two table in which each article is placed in the quadrant that most closely describes the way in which the term is conceptualized by its authors.

The first dimension assesses whether monetization is identified or implied as an "all or nothing" sort of transformation. A discrete conceptualization suggests that something either is monetized or is not monetized, while a continuous conceptualization suggests that something can be partially monetized or in the process of monetizing. Determining which category a particular usage belongs to is sometimes difficult, owing to ambiguity in the discussion or the fleeting nature of the authors' use of the term. In these instances, the author's unstated conceptual model can often be divined by asking whether monetization is described as a single, one-time event, or as an ongoing or gradual, process. The former consistently suggest a discrete conceptualization, while the latter imply a continuous treatment in nearly every case.

The second dimension assesses the scale at which the process identified as monetization is said to be operating. As with the first dimension, authors do not always provide much context to use in classifying their usage, and in these cases it is sometimes easier to ask whether the phenomenon undergoing monetization is an individual relation or thing or a corporate actor or social institution. Thus, this second dimension can also be thought of as indexing the degree to which the thing described as being monetized is a tangible, concrete thing like gold or agricultural products or a more intangible, abstract concept, like a society or economy.[1]

[1] Of special interest is the increasingly common practice of using "monetization" to describe a stand-alone process, similar to the way some authors might use the terms Bureaucratization, Modernization, or Westernization. Used in this "capital M" way, Monetization denotes a set of abstract conceptual ideas and relations without describing a specific instance or level of operation {{308 Kumar, Dharma 1985; 117 Thornton, Arland 1987; 310 Moraw, Peter 1989; 311 Rose, Nikolas 1992; 312 Kratz, Corinne A. 1993; 313 Mackie, Gerry 1996; 314 Eyal, Gil 2000}}.

The result of this cross-classification is presented in Table 2.1. The purpose of this table is not to completely represent the exact pattern of usage across the entire field (or fields) of sociology as might be done in a formal subject review. Rather, it is to demonstrate that considerable heterogeneity exists in the pattern of usage. Thus, the most important observation about this table is quite simply that all four quadrants contain many articles. This suggests that while individual authors no doubt feel confident about the conceptual meaning of monetization when they employ the term, a very different picture emerges when these works are viewed as a collective whole. There is actually considerable disagreement about whether monetization occurs at the scale of individual transactions or entire economies and whether it occurs all at once or in a more ragged, piecemeal fashion.[2] As these are two of the most basic conceptual questions imaginable, they speak to the low level of theoretical development surrounding monetization.

The key challenge posed by these many diverse appearances of the term in the literature is determining if and how they might be unified by a single theoretical construct. It may be the case that some of these are eclectic formations, resulting from a researcher's own creative grasping for words to describe a process observed in empirical research. But, the very uniqueness of the term "monetization," suggests that these many diverse instances are an attempt to describe the same core process or quality. If so, then a better appreciation for what precisely occurs when something undergoes monetization may enable the unification of many of these discrepant uses of the term under a single consistent theoretical framework. It would seem at first glance that different models of the spread of monetization are implied by the discrete/continuous distinction, as are different approaches to observing and measuring the concept. Likewise, the range of scales at which the process is thought to operate and the types of phenomena said to be undergoing

[2] This review focused only on articles in mainstream sociology journals that were available in searchable electronic databases. A more comprehensive review would almost certainly return additional examples in all four quadrants.

monetization are also quite broad. But as I will show in Section V, the conceptual definition of monetization developed in this paper relates the seemingly disparate phenomena at either end of these continua in a simple, yet consistent and grounded fashion. Under this new conceptual understanding, these different models and depictions of monetization are allowed to coexist, side-by-side, without the necessity of declaring one or another empirical account invalid.

Thus, the present state of affairs in sociology would appear to be one of considerable confusion, though largely unrecognized, over what exactly monetization is and therefore what it does. In order to address this state of under-theorization it is necessary to shed our familiarity with this thing that is money and examine it as a strange new object, for it is only in reestablishing the sociological meaning and significance of money itself that monetization can be fully understood. Therefore, in the next section, I take a much closer look at the range of existing theories of money, and by implication, of monetization.

EXISTING THEORETICAL APPROACHES TO MONEY: A CRITIQUE

Of the multiple perspectives on money, its meaning, and function, three major schools are identified here that represent well the diversity of thought on these matters. The first, shared almost universally in economics, I label the materialist-functionalist school, following Dodd (1994). The second school is the classic Marxist analysis of money, a vital element in the larger critique of capital and political economy offered in Capital and earlier works. The third school is based on the work of Simmel on human interaction, and receives its principal expression in The Philosophy of Money. While other writers have been inclined to discuss money and its relationship to other social phenomena, few have produced a unique, unified theory of money in the way these three schools have done so. This review highlights the weaknesses of each of these existing formulations, including those of Marx and Simmel, from a sociological standpoint.

The Materialist-Functionalist Approach to Defining Money

THE MATERIALIST APPROACH. What I label the materialist-functionalist perspective is in fact comprised of two independent theoretical approaches that are united in a shaky alliance by many scholars of money. The first, a materialist approach to the problem, emerged in the latter 19th Century as economists attempted a more systematic analysis of money. While the materialist approach to defining money does not fully supplant the popular notion of, "not barter," it does lend an air of objectivity to the concept. One of the earliest and most enduring of these classifications has been attributed to Jevons (1875), who stated that in order to be considered money, a substance must have certain material properties, which he summarized as *portability*, *indestructibility*, *homogeneity*, *divisibility*, and *cognizability* (ease of recognition, difficulty of forgery)[3]. These material qualities of money gained widespread use as a theoretical construct, becoming as popular among anthropologists as they were among the economists who promulgated them, and have survived to the present day almost exactly as Jevons proposed them(Bradford 1928; Dobeck and Elliot 2007; Neale 1976; Plattner 1989).

All such attempts to define, categorize, and evaluate substances as money fall under the designation of *materialist* approaches to conceptualizing money. As Dodd (1994) explains, the key conceptual task in this approach is descriptive in nature (xv). The argument is elegant at first glance: certain substances or commodities are better suited to serve as money than others, and therefore the characteristics determining fitness ought to be useful criteria for the identification of money. A materialist framework often underlies ideographic approaches to research, in which a great many substances that have in reality functioned as money throughout history and across

[3] While it is reasonable to credit Jevons with the organization of these various qualities into a single system, many, if not all were present in the writings of his contemporaries. As perhaps the best example, Marx, who was developing his critique of capital contemporaneously with Jevons, identifies at least four of these five qualities as the characteristics of the ideal commodity to take on the functions of the money form, a place he awards to gold {{328 Marx, Karl 1887}}.

cultures are catalogued and evaluated. This is borne out by the encyclopedic compendiums in economic anthropology detailing the many substances, the more unusual the better, that have served as money (e.g. Neale 1976). Plattner (1989), for one, applauds these efforts:

> One of the major contributions of early economic anthropology was to describe the wide range of things used to accomplish money functions. The list is enormous, including salt, shells, stones, beads, feathers, fur, bones, and teeth, as well as agricultural crops, animals, and of course, metals, from iron to gold and silver (175).

Without diminishing the importance of such catalogues, their contribution to a conceptual definition of money is questionable. First, while the materialist approach has the appearance of generality, in practice it is deeply rooted in analyses of "premodern"[4] forms of money, and the influence of these studies on the manner in which the definition is applied can be very strong at times, especially when the attempt is made to apply them to more "modern" contexts. The very descriptors *portability* or *indestructibility* must be reimagined considerably to achieve compatibility with a number of 21st century monetary forms. Just consider the myriad means of transferring funds electronically over the internet, as when an individual arranges to have "money" removed from a personal savings account and transferred to the account of an online merchant. Is this money, comprised solely of binary data *indestructible* in the same way as elemental metals such as gold or silver? Even granting that the elements of a materialist definition can be extended to new forms of money, the sheer volume and variety of substances that functioned historically as money, as well as the ever-growing list of monetary instruments that exist in fully "modern" economies suggest that virtually *anything* can be money, for better or for worse. Consequently, such an approach to defining money is only current until a new form of

[4] The terms modern and premodern, along with similar terms, are enclosed in quotes throughout in order to stress the implied non-neutral value statement that these terms possess. As will be seen, the conceptualization of monetization need not include any directional assumptions as previous formulations often have. That is, demonetization and monetization are assumed to be equally plausible, regardless of whether they are equally common empirically.

money comes along, at which point it must be added to the list (and the standards possibly adjusted to acknowledge some new technological breakthrough). From a theoretical standpoint, materialist definitions of money are therefore greatly conflated with the historical period in which that money is studied. Worse still, from the standpoint of theory-building, such deeply idiographic descriptions of the exact nature, function, and use of so many diverse monetary instruments work in opposition to the goal of generalizability.

But there is a second, more fundamental flaw in the materialist approach to defining money. Many of the substances that *can* function as money do not *always* function as money (Dodd 1994). Even an ideal substance for monetary exchange, one that is highly portable, indestructible, homogeneous, divisible, and recognizable, can be traded directly for another substance or used in a "non-monetary" way. Gold and silver coins could historically be melted down to produce jewelry, for example. Plattner's list of substances that have functioned as money recounted above (e.g. salt, fur, etc.) clearly speaks to this fact. The implication is that any definition of money that is solely dependent upon the physical characteristics of the substance will fail to consistently distinguish money exchange from other forms.

THE FUNCTIONALIST APPROACH. As if acknowledging the shortcomings of a pure *materialist* approach, this list of material qualities is frequently supplemented with a qualitatively different type of definition, believed to address the weaknesses of the first. Dodd (1994) identifies this second component of definitions as the *functionalist* approach to defining money (xvi). The functionalist approach is diametrically opposed to the materialist approach. It begins by defining the functions of money and then identifies monetary forms with reference to this list of functions (Dodd 1994: xxi). When faced with a newly emerging monetary instrument, a frequent occurrence in "modern" economies, the nomothetic task is to compare the instrument to

an idealized set of functions, collectively embodied in the notion of "general purpose money" (Dodd 1994; Plattner 1989). In contrast, the idiographic, materialist task was providing an accurate assessment of the nature of the instrument and its fitness for use as money.

The functions that money is argued to perform in society comprise a highly standardized list of elements. Money is said to act as 1.) a medium of exchange, 2.) a common measure of value (or a unit of account) 3.) a store of wealth or value, and, sometimes, 4.) a standard of deferred payment (Barker 1913; Bradford 1928; Dobeck and Elliot 2007; Kemmerer 1935; Plattner 1989; Shapiro 1975). The exact number of functions changes slightly as they are combined or replicated on the list, as do the labels given to these functions. In any case, the content of this ideal set of functions is of less significance than the way they define and identify money.

To explain the need for a given function, and hence money, writers have long followed the now-familiar pattern of juxtaposing money exchange against the more "cumbersome" system of barter. For instance, one undesirable consequence of barter that has been regularly noted is the lack of "coincidence of wants", famously illustrated by both Barker (1913) and Kemmerer (1935) with the quaint (and nearly verbatim) account by Jevons of "poor Mademoiselle Zélie," a Parisian singer who agreed to give a concert in the Society Islands in exchange for a third of the show's receipts. Her take was 3 pigs, 23 turkeys, 44 chickens, 5000 coconuts, and considerable quantities of bananas, lemons, and oranges (1913). As Barker dryly observes, "The Society Islanders, no doubt wanted to hear Mlle. Zélie sing, but Mlle. Zélie certainly did not want five thousand coconuts" (1913: 4).

If one assumes that barter is a voluntary exchange, it is not likely to occur unless the parties involved are convinced at least for the moment of the opportunity to better satisfy some

want if the transaction is completed. When there are parties in one's vicinity who have something of interest, and who are willing to accept what one has to offer in return, a "coincidence of wants" obtains. Because a substance which is recognized as a medium of exchange (money) may be accepted and held onto without fear of becoming stuck with it or its losing value over time, it is argued that money is able to overcome the coincidence of wants problem by decoupling the acts of buying and selling in both space and time. This observation also forms a central plank of the Marxist analysis, presented next.

This approach to defining money again falls short of the promises of objectivity and conceptual rigor for two major reasons. First, in the same way that a particular substance may not always be used as money, no single monetary form (at present) is able to simultaneously fulfill all of these functions perfectly (Dodd 1994). In fact, there are natural antagonisms between the functions. For example, if money is to function maximally as a medium of exchange, then it might be presumed that the more portable and transient it is the better. Meanwhile, if money is to function best as a store of value it must resist all decay, whether elemental or social. Shells, copper, silver, gold; each in its turn improved the overall functioning of money incrementally, thereby bringing the money in question into closer agreement with the ideal definition. This succession continued with the introduction of bank notes, paper money, personal checks, credit cards, debit cards, and on and on. All of these forms of money seek to fulfill the many functions of general purpose money completely and simultaneously, but in practice each remains at best only an approximation of this ideal type.

As an example, consider the ill-fated U.S. two-dollar bill. As a specific manifestation of the United States Federal Reserve Note, the two-dollar bill is an exceedingly fine store of value (barring inflation), an adequate unit of account, and perfectly acceptable as standard of deferred

payment. But as a medium of exchange, the two-dollar bill often functions quite poorly in practice. Numerous popular reports recount store clerks who refuse to accept a $2 bill as payment for services or goods, having *never seen one before* and believing them to be counterfeit (Olesker 2005). In one documented incident in 1993, an employee of Taco Bell refused to accept a customer's $2 bill as payment for his order. The vexed customer escalated the encounter until a manager was called to the scene only to have the manager express the same doubt, not just as to whether the bill was authentic but whether such a thing as a $2 bill *existed at all*. Not until a security guard arrived was the impasse resolved (Urban Legends Reference Pages 2005).

This example provides a nice illustration of two points. First, despite having all the backing of the Federal Reserve, the United States Treasury, and many other parts of the federal government apparatus, the ability of the two-dollar bill (or any potential medium of exchange) to function as money can be completely negated by a single naïve exchange partner. One question for theorists who embrace the functionalist approach is this: in that moment and precise social context, was the two-dollar bill money? It still functioned as a store of value equal to two dollars perfectly well, whatever that value is, but it has clearly ceased to function for the moment as a medium of exchange. What was required in this case to reestablish the $2 bill as money was the involvement of a representative of law enforcement, or a trusted authority figure, essentially an agent of the "state" who legitimated and enforced the acceptance of the medium of exchange (with the implicit threat of involving still further agents, if necessary). The significance of this story should be clear: the physical form and the functions of money are neither necessary nor sufficient in all cases for the completion of a monetary transaction.

The second point this example illustrates is that despite the clarity and appeal of the dual materialist-functionalist approach to defining money, the neat distinction between a function and

a material quality of money is nearly always muddled in practice. After all, it is just as valid to say that the two dollar bill failed the test of cognizability – and that it was this which prevented it from performing its function as a medium of exchange. As this illustration makes clear, these two systems are mutually reinforcing, each leaning on the other to an extent for support, both incomplete on their own. But even presented together in hybrid fashion, the materialist-functionalist approach to defining money fails on at least one major point. Even with the most detailed possible accounting of what money does and why it does it so well, proponents of the approach cannot theoretically distinguish what constitutes money *a priori*, but are only able to identify empirical examples *post hoc*. This amounts to an "I know it when I see it" strategy, providing some utility for researchers, but failing entirely in the larger tasks of stating exactly what is unique about money (Dodd 1994).

In contrast, the Marxist tradition which I describe next offers an exhaustive analysis of the forms of value, including money, from a very different perspective. Marx builds upon the work of his economist contemporaries, but among the improvements that the Marxist approach offers over the purely material-functionalist perspective is a theoretical bridge to the analysis of the wider human relations surrounding exchange.

Marx and the "Riddle of Money"

Befitting his status as a contributor to both economics and sociology, Marx's analysis of money contains elements of both the traditional materialist-functionalist perspective just described and the sociological, institutional view of Simmel and others explored below. But while much of Marx's multi-thousand page corpus deals in some way with the development and implications of a money economy, it is in his analysis of value that one finds the clearest expression of his thinking about the relationship of money to barter and exchange. The analysis

of value assumes its place in his writing only insofar as it is a necessary part of the groundwork for his larger project of critiquing capital, and as soon as it is adequately addressed, Marx moves on to this primary task.[5] Thus it is possible, and a great simplification, to confine this discussion of the general Marxist perspective on money to the fullest expression of Marx's theory of value, found in Capital Volume 1 (Marx 1887).[6] I leave the connection between Marx's larger analysis of capital and the theory of monetization for future exploration, delving instead more deeply into the contrast Marx paints between barter and money exchange as distinct phenomena.

In his analysis of the forms of value, Marx posits a typology consisting of one form of use value plus four forms of exchange value, presented in a definite order that reflects an underlying model of the historical development of the money form (1887: Ch 1, Sect 3). Each of the forms of exchange value describes a particular expression of the relationship between commodities, and each is fundamentally distinct from the use value of the commodity. This careful distinction between the use value of a commodity, assessed in highly personal terms for the person who will use it, and the exchange value of that commodity in relation to some other commodity is an important contribution to the general analysis of money, one that Simmel, for one, is less clear about. Marx notes with frequency that these two distinct forms of value were often confused by his contemporaries, to the detriment of a proper understanding of value and money (1887: Ch 1, Sect 1).

Laying aside use value for the moment, Marx's four-part typology of exchange value begins with the Elementary or Accidental Form of Value. At the heart of this formulation lies the

[5] The truth of this is demonstrated by the fact that the term "barter" and discussions of this form of exchange appear almost exclusively in the first three chapters of Capital.

[6] Multiple translations, versions, and printings of Capital exist, many with different page numbers. To reduce confusion for readers who wish to refer to specific citations and quotations, they are references according to the Chapter, Section, and Subsection, where applicable, as these divisions, with few exceptions, are stable across editions. All passages quoted from Capital come from the First English Edition of 1887, translated by Samuel Moore and Edward Aveling and edited by Frederick Engels.

concept of human labor. While the production of each useful commodity requires qualitatively different types of labor, all commodities relate themselves to each other through the basic quality that all embody: human labor (1887: Chapter 1, Section 2). In the case of this first form of exchange value, two commodities relate directly and uniquely to one another without an intermediary, a process that must therefore be carried out for each possible combination of commodities; tedious to say the least. Marx's favored illustration makes this type of relationship between commodities clear: a certain amount of linen (say 20 yards) can be exchanged for one coat. The exchange value of each commodity can thus be expressed in a certain quantity of the other commodity, which functions in the role of the equivalent value.

Slightly better than the elementary form of value, the total or expanded form of value allows multiple commodities to be related to each other in a chain. But, as Marx notes, this is "nothing but the sum of the elementary expressions or equations of the first kind" (1887: Ch 1, Section 3, Subsect B). Continuing with Marx's simple illustration, the coat-value of 20 yards of linen is first determined, and then the tea-value of 1 coat, and then the coffee value of 10lbs of tea, and so on, with the chain of equivalences continuing indefinitely through as many different possible pairings as exist in the entire sphere of economic exchange. While cumbersome, the expanded form of value represents an important intermediate stage of development leading to the general form of value.

The third form of value, the general, represents a qualitative leap in human ingenuity, as the exchange value of all commodities is now expressed in a single commodity (1887: Ch 1, Sect 3, Subsect C). Marx notes that the functions of this commodity, known as the general equivalent, are best performed by gold for the reasons discussed in connection with the materialist/functionalist school: gold is durable, divisible, recognizable, and so forth (1887: Ch 1,

Sect 3, Subsect C). But lending support to the critique of the pure materialist position described above, Marx implies that these characteristics do not determine what constitutes money in a physical sense, but rather define those commodities that best perform the function of money in a social sense:

> In proportion as exchange bursts its local bonds, and the value of commodities more and more expands into an embodiment of human labour in the abstract, in the same proportion the character of money attaches itself to commodities that are by Nature fitted to perform the *social function* of a universal equivalent. (1887: Ch 2, emphasis added).

It is but a small intuitive leap from this sort of general equivalent embodied in a commodity to the fourth form of value, the money form. The chief difference between money and the general equivalent is that general equivalents are commodities that, when not functioning in their role as measure of value, have some use values of their own, whereas the money form is exchange value in its purest expression, a commodity that exists only to measure value (1887: Ch 1, Sect 3, Subsect D).

While each of these forms of exchange value is qualitatively distinct from the others, all of them differ in the same fundamental way from direct barter. The latter Marx briefly, but succinctly describes as the exchange of one *use value* for another (1887: Ch 2). Thus, the Marxist analysis of money posits something considerably more complex and nuanced than the simple barter/money dichotomy found in the popular and materialist-functionalist formulations. For Marx, between barter and money lie three distinct forms of exchange value: the elementary, expanded, and general. It is unfortunate that Marx did not expend the same critical energies providing an analysis of barter as he did for exchange value, but this is understandable in light of his objectives. As it stands, Marx's theory of barter is not generalized or abstracted to the general case, remaining closely intertwined in his writing with the forms of society in which it

principally occurs, a problem that was also observed to hold for the materialist-functionalist approach. Marx implies that barter can take place only in contexts where commodities are not produced with an eye toward exchange because when production for exchange occurs the elementary form of value replaces barter as the mechanism permitting exchange (1887: Ch 2). Thus, it can be extrapolated that, for Marx, what distinguishes barter from the other forms of exchange is the *purpose* that drives the expenditure of labors in the first place, a potentially difficult concept to measure reliably.

A second difference between money and barter that Marx more explicitly identifies concerns the sequence of events involved in an exchange of one commodity for another. This is best illustrated using the notation favored by both Aristotle and Marx, in which a commodity is represented by C and money by M. Using this notation, monetized exchange might be characterized as C—M M—C (sometimes just C—M—C), a circuit of exchange where a commodity first drops out of circulation and is replaced by money and the circuit is then completed from the perspective of the original seller when the money is again converted into a different commodity (1887: Ch 3, Sect 2, Subsect A). Barter exchange, in contrast, could be represented in this notation by C—C, where this is a literal depiction of the exchange and not shorthand for the longer C—M M—C circuit as Marx sometimes employed the expression. The implication is not only that money is not involved in barter, but that the barter exchange occurs principally between two actors who simultaneously act as both "buyers" and "sellers," whereas the money form enables an actor's act of selling to be separated in time and space from the act of buying, a quality previously ascribed to money. It also allows each portion of the "metamorphosis" from commodity to money and back to involve different parties (Marx 1887: Ch 3, Sect 2, Subsect A).

One significant consequence of the two previous observations is that much of what others describe as barter may not constitute barter at all according to Marx. Rather, these exchanges may actually involve one of the higher forms of value, but are carried out without an actual physical money form being present. This might be represented as C—(M M)—C, where the partitioning of money in the center is meant to signify this portion of the exchange process takes places entirely as mental activity on the part of actors who use money as a unit of account to measure the value of two commodities, and then exchange them directly. In such a case, Marx would be right to deny that this type of transaction is direct barter by his own standards. First, while hidden to the unobtrusive observer, it is the exchange values of the commodities that are being related, not their use values. Second, and more fundamentally, such a mode of exchange suggests that the commodities may have been produced with an eye toward exchange, a key characteristic of non-barter exchange for Marx.

Beyond these points, what most sets Marx (and Simmel) apart from the materialist-functionalist school is the context of the exchanges described in the foregoing presentation. Marx makes explicit many times and in many ways that money is a wholly social phenomenon with no reality or meaning apart from the social interaction of exchange. In the sampling of passages that follows, Marx fully reveals his sociological inclinations:

> It thus becomes evident that since the existence of commodities as values is purely social, this social existence can be expressed by the totality of their social relations alone, and consequently that the form of their value must be a socially recognised form (1887: Ch 1, Sect 3, Subsect C1).

> Value, therefore, does not stalk about with a label describing what it is. It is value, rather, that converts every product into a social hieroglyphic. Later on, we try to decipher the hieroglyphic, to get behind the secret of our own social products; for to stamp an object of utility as a value, is just as much a social product as language (1887: Ch 1, Sect 4).

> …a particular commodity cannot become the universal equivalent except by a social act (1887: Ch 2).

And perhaps Marx's clearest statement about both the distinction between barter and the monetary exchange of commodities and the social character of the latter process,

> We see here, on the one hand, how the exchange of commodities breaks through all local and personal bounds inseparable from direct barter, and develops the circulation of the products of social labour; and on the other hand, how it develops a whole *network* of social relations spontaneous in their growth and entirely beyond the control of the actors (Marx 1887: Ch 3, Sect 2, Subsect A, emphasis added).

There are a number of ideas contained in the above passage that will reemerge in the theory developed in the next section. In particular, while Marx explicitly states elsewhere that money is not a pure symbol, he seems to hedge this statement by suggesting that the money form contains a certain abstract quality that is a purely social construction (1887: Ch 2). That this quality has the potential to be divorced from the others rescues much of his subsequent analysis from the criticism that it does not allow for money to regularly take the sorts of wholly immaterial physical forms (i.e. not gold) that it regularly has done so in the past century. And in any case, Marx is not to be faulted for failing to be perfectly prophetic. The possibility of this purely symbolic money, of which the token is an example, is even more clearly acknowledged when Marx writes,

> …in this process which continually makes money pass from hand to hand, the mere symbolical existence of money suffices. Its functional existence absorbs, so to say, its material existence. Being a transient and objective reflex of the prices of commodities, it serves only as a symbol of itself, and is therefore capable of being replaced by a token. One thing is, however, requisite; this token must have an objective social validity of its own, and this the paper symbol acquires by its forced currency. This compulsory action of the State can take effect only within that inner sphere of circulation which is coterminous with the territories of the community, but it is also only within that sphere

> that money completely responds to its function of being the circulating medium… (1887: Ch 3, Sect 2, Subsect C).

By invoking the State as the only way symbolic money can function in the absence of a material form of value, Marx implicitly reinforces the institutional perspective on money developed here. Put simply for now, money, to function as a pure symbol, requires the compulsory action of the State (or a similar institutional structure) to enforce the acceptance of an object or symbol with no inherent use value in exchange for the alienated product of one's own labor. Moreover, Marx makes clear that money in this form is inseparable from such an institutional structure because the functionality of money extends only as far as the influence of the State.

To summarize, Marx provides a clear analysis of the development of the money form, far more subtle and detailed than the simple barter/money distinction portrayed by proponents of a materialist-functionalist understanding. And yet, despite the confidence that Marx expresses in the superiority of this analysis, he, like others, refers to money as a "riddle" and a "mystery" on numerous occasions, and not simply rhetorically. Simmel, on the other hand, lays his finger more directly on why money is such a puzzle to his contemporaries. Namely, that in focusing on money itself to the exclusion of the social structures that accompany it, money is stripped of its social character, and this inevitably leads to confusion on the part of observers who are thus led to ascribe to money, a mere thing, properties and powers that can only belong to networks of human actors themselves. To see what was and is so innovative about Simmel's approach I now describe the essential elements of his analysis of money.

Simmel and the "People behind the Objects"

Simmel's analysis of money, presented in The Philosophy of Money (Simmel 2006), is a unique work, employing few of the conventions found in other treatments. The level of attention he devotes to money in the more than 400 page Philosophy of Money surpasses that of even Marx. But it is the fundamentally sociological character of Simmel's approach that makes it ideally suited to serve as the basis of a modern sociological theory of money and monetization. Specifically, Simmel's observation that it is the "people behind the objects" that are of principal interest in studying exchange, monetized or not, should serve as the foundation of both the theoretical and methodological analysis of money. As I will show in Section IV, by situating human exchange in an explicit institutional context, and acknowledging the roles of information and social network structure in shaping this exchange, this fundamental contribution of Simmel can be extended to serve as the basis of a more complete understanding of money and monetization.

As with Marx, Simmel's careful study leads to some of the same general observations about money made by the materialist and functionalist approaches:

- Money is a medium of exchange (2006: 126),
- Money should exhibit divisibility (2006: 128),
- Money is the pure value of a thing and not the thing itself (2006: 121), and
- Money must be counted on to have a consistent value in the future (2006: 178).

Yet Simmel's orientation towards money and its "services" (2006: 188) is actually quite different from the functionalist perspective, best expressed in his declaration that "Money, whatever represents it, does not *have* a function, but *is* a function" (2006: 169, emphasis in original). This begs the question: a function of what?

Far more plainly than Marx, Simmel establishes himself as working from the emerging sociological perspective when he references the fundamental social nature of both money and exchange:

> …exchange is a sociological phenomenon *sui generis*, an original form and function of social life (2006: 100).

> It is, therefore, almost a tautology to say that exchange brings about socialization: for exchange is a form of socialization (2006: 175).

> …since money is *entirely a sociological phenomenon*, a form of human interaction, its character stands out all the more clearly the more concentrated, dependable and agreeable social relations are (2006: 172, emphasis added).

As the last statement indicates, Simmel believes that the very development and existence of a monetary system of exchange is predicated on certain essential characteristics of *human interaction*. This is a familiar theme to students of Simmel, for whom nearly all human interaction is exchange of one sort or another, whether of information, goods, labor, or other thing of value: "Every interaction has to be regarded as an exchange: every conversation, every affection (even if it is rejected), every game, every glance at another person" (2006: 82).

Unlike Marx and the economists, Simmel conceptualizes barter exchange and monetary exchange as two distinct, but substitutable variations of the same *sociological phenomenon*. But if these two systems are substitutable, however poorly one may perform in comparison with the other, attempts to paint them as different social systems are misleading. In treating money as a separate sociological phenomenon from barter, one suggests that the transition from barter to money exchange is the *extinction* of one sociological form by another. This is exactly the imagery employed in traditional economic accounts of the "evolution of money" (Bonnie 1933:

53). But instances appear to abound of societies that function with both systems intact without any visible signs of antagonism. One economic sector may become monetized while another "lags" behind, remaining "mired" in barter transactions. This coexistence may be merely a transitional stage, but if so, the transition has been occurring since the introduction of money and continues to the present day, even in highly developed economies.[7] Thus, in contrast to the common practice of defining barter as the cipher of money exchange and money exchange as anything that is not barter, Simmel's view is that they are in fact two forms of the same *sociological phenomenon*. In conceptual terms, both are theoretically distinct, and yet are clearly subsumed under some larger conceptual umbrella.

Against the three analyses of money presented in this previous section, I will posit a theory of monetization which, while rooted heavily in the work of Simmel with contributions from Marx's critique, also brings in important interdisciplinary contributions from anthropological and economic writings and from institutional and social network theory. In order to make the presentation of these widely divergent streams of thought as efficient as possible, they are discussed only in terms of their utility for this synthetic theory, and not in their broader context as independent lines of research in their own right. To this end, I address four major issues: 1.) the theoretical meaning of exchange, as separate from transfers and transactions, 2.) the role of information in exchange, 3.) the institutional framework of exchange, and 4.) the social network significance of modifying the manner in which exchange is carried out. At the

[7] It may also be the case that the advent of new technologies has actually *increased* the practicality and use of barter in these highly developed economies, again suggesting the lack of an antagonistic relationship. The internet is an ideal instrument for reducing the "coincidence of wants" problem associated with barter transactions. Websites like Craigslist.org, Freecycle.org, and Kijiji.com allow users to greatly expand the extent of their search, increasing the odds of finding an acceptable trading partner, at little or no cost to the transactors in terms of time spent searching. Had the aforementioned singer Mlle. Zélie had access to a comparable service in the 19th Century, she might have had fewer reservations about accepting 5000 coconuts and sundry livestock in exchange for her performance, knowing that these items could be shipped overnight to suitable buyers in Alaska, Britain, or China in exchange for cash or something else that she could actually use.

conclusion of this discussion, I present this synthetic theory and then proceed to evaluate its utility in comparison to two of the three perspectives presented above.

INSTITUTIONS, INFORMATION, AND MONEY: A SYNTHETHIS

Exchange, Transactions, and Transfers

I turn first to providing a stronger theoretical framework for understanding general human exchange, of which Simmel maintains barter and money are examples. This is necessary to fully appreciate the final observation of the previous section that barter and monetary exchanges are two forms of the same sociological phenomenon. Hunt (2002) reviews anthropological literature on exchange and suggests that the three traditional approaches to conceptualizing forms of exchange in anthropology result in suboptimal formations. To advance the analysis of economic exchange, Hunt proposes a distinction between economic transfers and economic exchange. They are nested concepts in his framework. All economic exchanges involve transfers, but not all transfers are exchanges. To constitute a transfer, a thing of value must change ownership, at least temporarily (2002: 108). There need not be reciprocity. Prior concepts including “the gift” and “negative reciprocity” (Sahlins 1972: 195-196) can be subsumed under the concept of the transfer. These are, essentially, “one-sided exchanges.” In a full-fledged exchange, another thing of value must be returned (Hunt 2002: 109).

Two observations about this formulation hold special relevance. First, the exchange need not be simultaneous. Ongoing systems of economic exchange may exist in which assemblages of goods or services are doled out in ongoing fashion. Such a system often characterizes “personal” or “embedded” social networks (Granovetter 1985), owing to its dependence on long-term associations between transactors and emphasis on “security” before “profit” (Plattner 1989: 218).

Second, it seems likely that few actors in economic systems or societies acknowledge an exchange as two independent transfers. Rather, in practice, the exchange is viewed as a single act. Marx, for one, makes this point and goes further, to suggest that in cases of a C-M-C type circuit, the entire interaction will likely be viewed as a single economic act by all concerned, despite the highly significant fact (for Marx) that half of the circuit is typically carried out with a different party than the other (Marx 1887: Ch 3, Sect 2, Subsect A). Viewing multiple economic actions involving two or more parties as single acts serves to conflate acts of transfer and exchange and is partly responsible for the conceptual confusion which Hunt describes.

Thus, in the present analysis, *exchange* denotes the most general concept, synonymous with the *transaction*. Both barter and monetary exchange constitute full forms of exchange, in which things of value trade hands, while a transfer is conceptualized as a 1-sided shift in resources from one to another. In practice, many transfers may be incomplete exchanges, but this distinction is of less importance to the present theory than the recognition that monetization, whatever it is, must involve an alteration in the way that *exchange* is carried out. So linking the study of money to the study of social exchange generally will have numerous theoretical advantages.

The Role of Information in Exchange

As the preceding section demonstrates, the current anthropological study of exchange addresses several fundamental questions surrounding exchange that garner little attention in other disciplines. The role of information in exchange is another important example. Plattner observes that all exchanges involve several distinct forms of *information* (1989). This information relates to the "goods" involved, the "transactions" involved, and the "actors" involved (Plattner 1989: 218). Under information about "goods", Plattner includes immediately

perceived attributes of the thing to be exchanged. Examples include size, color, and composition in the case of goods, but this category of information could apply equally well to other things of value such as labor and services. Also grouped as information about "goods" is what Plattner terms "experience quality" – attributes of goods that are only exposed through use, such as durability, or in the case of labor, the intensity or skill with which a worker performs her or his tasks. Next, information about the "transaction" includes price, the conditions of payment (i.e. what will be accepted in exchange), and the probability that the given exchange will be successfully completed. Lastly, the type of information available about "actors" is concisely summarized by Plattner's statement that "Knowing *who* a trader is may sometimes be the best way to know *what* he is buying or selling" (1989: 218).

If barter and money are different means of accomplishing economic exchanges, which take place in all societies, then a better way to understand the difference between these two forms of exchange may lie in the multiple forms of information embedded in the exchange just enumerated. To better understand these differences, and place both forms of exchange in the proper institutional context, I turn now to the institutional nature of exchange.

Barter and Monetary Exchange Institutions

Simmel described money as "an original form and function of social life" and indeed it is appropriate to conceptualize economic exchange, monetary exchange, and barter as requiring a set of social institutions. I employ the term institution to denote a "…structure that human beings impose on their dealings with each other" (North 1992: 9). Many conceptualizations of "institution" exist, but North's (1981, 1992) is especially appropriate because of his efforts at interjecting institutions into economic analyses, arguing that money and monetary systems

should be dealt with both as institutions themselves and as phenomena that are *impacted* by institutions.

Elaborating on the concept of institutions, Hodgson (2004) states that they are:

> …durable systems of established and embedded social rules that structure social interactions…. By their nature, institutions must involve some shared conceptions, in order to make rules operative. According to this definition, systems of language, *money*, law, weights and measures, traffic conventions, table manners, firms (and all other organizations) are all institutions… (2004: 14, emphasis added).

Hodgson, like North, declares that money systems are undoubtedly institutions. I have already shown that Marx shared this view, and one finds an equally plain assertion that money is a social institution in the writings of Simmel (2006: 184).

While at times money, money systems, exchange systems, and barter are all interchangeably referred to as social institutions, the observations made earlier suggest a more precise interpretation. It is in fact not money itself that is the institution. Money is, for lack of a better term, a technology which has no function outside the context of the social institutions that exist for its use and support. Marx, to his credit, made this point explicitly as has been seen. Simmel draws attention to the same when he asks,

> If the embodiment of the action of exchange in a particular form is accomplished technically in such a way that each object is first exchanged for this form rather than directly for another object, the question arises: upon closer examination, what is the corresponding behavior of *the people behind the objects*?" (2006: 177, emphasis added).

The acknowledgment and identification of a social institutional framework for the conduct of monetary exchange permits the following, fundamental observation to be made: even the simplest monetary transaction is an exchange involving not two, but a minimum of three parties: the two transactors and some "higher or intermediate" social organ (Simmel 2006: 175).

Put simply, barter is an essentially private exchange act, whereas regular money exchange depends upon the subsequent continued recognition by an economic community or a government of the symbolic value of the substance functioning as money. Simmel avows that monetization requires a social element to proceed; shared expectations, rules, and norms, among other things, must be put in place. Having been reminded of the institutional character of all forms of social exchange, one last piece of the puzzle remains to be laid into place: the description of the general social structure in which exchanges take place in explicit social network terms.

Dodd's Social Network Contribution

Dodd (1994) argues that monetary exchange is more than just bartering with better information: "It is altogether distinctive," he writes, "It requires the pre-existence of minimum forms of information, extended through time and across space, in order to proceed" (xxvi). What distinguishes barter from money exchange in this formulation is not the presence or absence of physical money, nor the question of whether the transacting parties recognize the things of value being exchanged only for their inherent use value or for their exchange value. Rather, it is the form of information required in order for each type of transaction to be successfully and voluntarily completed. These "forms of information" are regulated extensively by social institutions. Affirming the inadequacy of the materialist and functionalist approaches to defining money, Dodd suggests that the solution is "…to focus on the social relationships that monetary transaction involves, not the objects which mediate those relationships" (1994: xv).

Dodd thus appears to be the originator of the suggestion that it is possible to define money using the *social networks* that accompany and facilitate exchange in all societies, as these are immediate structural forms through which the more abstract monetary institution is observed. His approach is succinctly summarized in the statement that follows:

> The information implicit in monetary transactions provides the most fundamental point of distinction between monetary exchange and barter….this distinction arises not from comparison of monetary and non-monetary forms but from examination of the network of social relationships integral to each as a type of exchange. (1994: xxiii).

A comparison of network characteristics and in particular the types of information embodied in these networks over time and through space, will allow the analyst to clear the most basic conceptual hurdle: distinguishing money from non-money (1994: xxii-xxviii). And also, in keeping with the spirit of Marx, it should now be possible to identify the relevant exchange network of a given actor, and see that this network, through the regular conduct of exchange functions as the first, most readily observable face of the state or other social institutional structure behind money.

Synthesis

Combining the elements presented in this section, it is possible to make a number of new theoretical statements about monetization and money. Most generally, *monetization is the introduction of new types, flows, and qualities of information into exchange networks.* For example, the introduction of an abstract unit of account represented symbolically by some entity is a fundamentally new layer of information. *Things of value that are transferred or exchanged, whatever their intrinsic properties, can be money only if the economic interaction takes place under the influence of a social institution that recognizes and supports money as a function of economic life.* Money is the object, humans are the actors. And rather than focusing intently on the form and function of money, one should be asking, as Simmel asks: what is the behavior of these actors? The sociological significance of such a different perspective on money should be easily apprehended. Moreover, this problem promises to be more theoretically interesting than simply distinguishing what constitutes money as an object (2006: 177). This is not to say that

money objects are unimportant, but rather that from a sociological standpoint, the investigation of the people, networks, and institutions behind this peculiar class of objects ought to capture the full attention of researchers. *For money to perform any social function at all, it must be accompanied by many of the aspects of a social institution.*

Returning to an earlier question, this may be what Simmel meant by his somewhat cryptic observation that money does not *have* a function, but *is* a function. In this framework, money does not have functions because it is just an instrument used in the service of a complex set of social rules and institutions. Nowhere at present is this more clearly evidenced than in the evolution of digital finance. It has grown increasingly common for salaries to be earned, bills paid, and exchanges of all manner carried out without ever involving any physical referent at all. In the 21st century, money may well be approaching a state of putative perfection, of becoming true "generalized money," whereby it is fully divested of the last shred of physical substance and becomes a pure symbol as Marx partially portended (barring a power outage). From a research perspective, this has been a highly positive development, as it increasingly pressures scholars to reinstate the focus of monetary studies where I argue it belongs: on the structure of social exchange relationships that utilize money and other forms of exchange, and on the social institutions which make money possible, rather than on those bits of metal, paper, or shells that seem to arrest our attention as researchers and as human beings.

MONEY AND MONETIZATION IN THE WORLD: RADFORD REVISITED

An Empirical Application

I demonstrate the utility of the theory developed in Section IV in two ways. First by showing that refocusing attention on social institutions and networks and away from money itself

provides considerably better understanding of the process of monetization. This shift also generates many intriguing new research questions that deserve empirical attention. Second, I will return to the two-by-two typology of current usage in sociology and demonstrate the organizing effect that the revised theory has there and note the new possibilities for integrating these many divergent perspectives on monetization.

What is required for the first task is an application that can be used to evaluate the effectiveness of this elaboration of monetization theory against conventional theoretical treatments. I use the classic study carried out by Radford (1945), in which he describes the "spontaneous" development of a money economy in the German P.O.W. camps of WWII. This example serves as an ideal first test case for evaluating the new theory for at least three reasons. First, monetization is rarely observed in a scientific fashion as it happens, so Radford's account is correspondingly rare. But, as will be detailed below, it does in fact have all of the requisites of monetization, starting from a state of fully non-monetized exchange and proceeding to fully monetized exchange, with each stage clearly described and annotated by Radford himself. Second, and more crucially, there is enough information in Radford's account to enable the new elements of the theory to be falsified if they fail to match the empirical case. And third, Radford's account is widely promulgated in introductory economics textbooks and classrooms (Abbott and Nantz 2001; Hansen 1983; Katzner 1991). As such, it continues to function as a prominent pedagogical tool that has been used to train generations of researchers in the theoretical aspects of money and monetary exchange. Thus, as a matter of course, any revision to the general theory of money ought to provide improved interpretations to the existing paradigmatic problems associated with the current theory. (Kuhn 1962)

In “The Economic Organization of a P.O.W. Camp” (1945), the economist R.A. Radford provides a first-hand account of his experience as a captive in a German Oflag, a particular type of camp for allied prisoners of war in which the prisoners were not required to perform labor for wages by the detaining power (190). When allied forces were captured on the European continent in the course of the war, Radford reports that they entered an elaborate network of German-controlled P.O.W. camps in which most prisoners started out in less stable, temporarily erected facilities and in time were transferred to larger and more permanent installations, frequently spending time at so-called “transit camps” en route. Radford describes the Oflags thus,

> They consisted normally of between 1200 and 2500 people, housed in a number of separate but intercommunicating bungalows, one company of 200 or so at a building. Each company formed a group within the main organisation and inside the company the room and the messing syndicate, a voluntary and spontaneous group who fed together, formed the constituent units (190).

As Berliner (1999) notes,[8] there were two principal sources of food and goods in the camps, both of which served to keep the initial distribution of goods (or “incomes”) throughout the camps equal: German rations of food and clothing; and packages sent by the International Red Cross that contained tinned beef (“bully beef”), biscuits, chocolate, and cigarettes, among other things (1999: 57; Radford 1945: 190). Against this backdrop, Radford describes the development of a system of monetary exchange, beginning with simple trade or barter and evolving rapidly to a full-fledged money economy.

Berliner divides Radford’s description of this developmental process into five distinct stages. In Stage 1, prisoners casually trade unwanted items from their own Red Cross packages

[8] In presenting the particulars of the account, I rely heavily on Berliner’s {{316 Berliner, Joseph S. 1999/a}} concise presentation.

for items from others' packages that they preferred (1999: 57). Radford describes the direct bartering at this stage as "a more equitable means of maximizing individual satisfaction" than simply relying on one's own assortment of goods, but also characterizes the hours following the arrival of a Red Cross shipment as "bedlam" (191).

The growing frequency and complexity of trades led to Stage 2 which saw the establishment of a bulletin board on which interested parties could place notices for items wanted and offered, along with acceptable terms of exchange (1945: 191). An important corollary of this development was a much greater uniformity in the valuation of various commodities and a fixing of their relationships to each other due to the public nature of the notice board.

Stage 3 of development according to Berliner was the establishment of cigarettes as a "medium of exchange" (1999: 58). Thus it became commonplace for the P.O.Ws to speak of the "cigarette-price" of a tin of beef or a bar of chocolate. As a direct consequence of the establishment of cigarettes as the "standard of value" (Radford's term), even non-smokers were now willing to accept cigarettes in exchange for other things of value, safe in the knowledge that they could be traded for something else of value (191). In the language of the materialist-functionalist school, cigarettes had become the accepted medium of exchange, as well as the "unit of stored value," enabling actors to begin amassing small fortunes in Tobacco. In Radford's account of the development of money in the P.O.W. camp, there were two perennial problems surrounding the use of cigarettes as money for many of the prisoners: the temptation to smoke one's savings, and the possibility of "sweating" the money. This term originated to describe the practice of removing tiny amounts of metal from coins of gold and other precious metals, resulting in the debasement of the currency over time. This was accomplished in the P.O.W.

camps with cigarettes by removing small amounts of tobacco from each cigarette and then re-rolling this tobacco into additional cigarettes (Radford 1945: 194).

In Stage 4, an official store sprang into existence, sanctioned by the German prison camp administrators and staffed by prisoner volunteers. The store offered "Bully Marks," simple tokens with no practical value of their own, in exchange for any of the goods received in a Red Cross shipment that a prisoner did not want or need (Berliner 1999: 58). Cigarettes were now wholly supplanted, not only as the medium of exchange, but also as the "unit of account," a phrase that refers to the commodity in which money is denominated. In this case, rather than being worth so many cigarettes, a Bully Mark was equivalent to a certain amount of bully beef, in the same way that, during the days of the gold standard, United States dollars were backed by a fixed amount of gold. Bully marks had an added advantage over cigarettes of being resistant to "sweating" and of not tempting the men to literally watch their fortunes go up in smoke.

Stage 5, the final stage in Berliner's typology, was never achieved by the P.O.Ws in Radford's camp, but would have been reached when the shipments of Red Cross provisions ceased to go directly to the P.O.Ws altogether. Instead, the shipments would have gone directly to the store, which would have then issued each prisoner a fixed amount of Bully Marks equivalent to the value of the goods in one Red Cross package (Berliner 1999: 58). Berliner argues that this arrangement would have removed the need for P.O.Ws to sell unwanted items back to the store and would have been reached had the war not drawn to a close. Radford points out that the final days and weeks of the conflict were marked by ever-increasing instability as the mostly orderly system of P.O.W. camps in Germany fell into complete chaos (1945: 197-198), ensuring that this higher level of economic organization was never reached.

While there are many more subtle and intriguing elements of Radford's account, this broad outline of events will suffice for the present analysis, with additional details brought into the discussion where appropriate. The brief interpretive notes added to the above account are derived directly from Radford and are in keeping with conventional accounts of events as they appear in contemporary treatments. As such, they will serve as a baseline for comparison against the alternative interpretation developed here. In order to make this comparison possible, I turn now to a formal analysis of various theories of money.

Three Interpretations of Radford's Account

I compare the new theory developed in this paper to two of the three alternative formulations presented in this chapter: the materialist-functionalist perspective and a purely Marxist perspective. I have chosen not to provide a purely Simmelian interpretation of Radford's account simply as a matter of efficiency. Since a substantial portion of Simmel's analysis has been incorporated into the synthetic theory presented here, the chief advantage of my neo-Simmelian perspective over the approach of Simmel himself is its more explicit formulation in terms of social networks, institutions, and information, each of which remain underdeveloped notions in Simmel's original work. In judging the effectiveness of each approach, I wish to draw attention to the types of useful empirical questions and new directions for research that are generated by each interpretation of the classic account by Radford described in Section II. It should be stated that these interpretations need not be mutually exclusive. Rather, like concentric circles, each may incorporate much of the preceding formulations, but adding additional levels of understanding and pointing to those issues about which existing perspectives are silent.

For the essential elements of the materialist-functionalist interpretation of events in the P.O.W. camp, one need look no further than Radford's own account, written from the

perspective of a classically trained economist. To recapitulate these points, consider the following explication:

> ***The Materialist-Functionalist Interpretation***: As Radford describes it, prisoners were initially faced with identical assortments of goods and a varied assortment of preferences for these goods. As a result, there was something to be gained if one could exchange some part of his parcel with another. As the regular distribution of Red Cross rations is established, the men become more habituated to one another and the routines of the camp life. The men are placed into still larger camps where the frequency of exchange increases further until the inefficiency of barter drives the prisoners to establish the notice board. This helps them to overcome the "coincidence of wants" problem and aids in the establishment of regular relations between different goods. The time from the arrival of the first packages of rations to the creation of such a commodity exchange: 1-2 weeks. Within a month, the basic qualities of cigarettes – small, portable, easily divisible, recognizable, durable relative to the length of confinement, etc. – render them superior to other goods as a means of expressing the value of things. Thus cigarettes become established as a kind of commodity money and begin to assume all of the typical functions of money identified in Section III – medium of exchange, unit of account, store of value, etc. – making them desirable to all, not just smokers. When the prisoners in Radford's group arrive at the large, permanent camps in Germany, a small store and restaurant are established, enabling P.O.Ws to sell unwanted items to an intermediary and to accept "Bully Marks" in exchange, which can be used to purchase items from the store or restaurant and for exchange with other prisoners. These Bully Marks represent the full realization of a money economy, just weeks after the soldiers began with crude, simple barter, and the impetus for the creation of such a system is identified as the ever-growing frequency of trade, which at each stage of development served to multiply the inefficiencies of each simpler system. Thus, this is a narrative which purports to describe and explain the "spontaneous" development of a money economy from a very simple state in something on the order of a few months.
>
> ***The Marxist Interpretation***: In the first weeks of the prisoner's experience, each acquires a collection of commodities, not through his labor (for none is required of the prisoners), but through what Berliner calls a system of distribution by assignment. The use value of each type of good varies from man to man, and so the direct barter of commodities between men leads to a better distribution of use values among them. This system of exchanging use-value for use-value suffers from all of the inefficiencies described in the previous account, and in addition, quickly erodes due to the fact that the men begin to look forward to the next shipment, when they can obtain new goods for exchange. From this, the elementary form of value, in which commodities confront each other directly, the process rapidly becomes more elaborate, and the total or expanded form of value, a chain of relationships, evolves. This chain of equivalences can be traced by each man through the string of postings on the bulletin board. Soon, that commodity best suited to fulfill the functions of the general equivalent rises to the occasion. In light of the available commodities, cigarettes are the best choice, for the same reasons given in the previous account. Thus cigarettes are destined to take on the role of general equivalent, the

commodity in which the exchange value of all other commodities is expressed. Lacking access to a better general equivalent such as gold, a form of token money emerges to enable the transition from general form to money form to proceed. Bully Marks are the highest form of value achieved – the money form. While most commodities circulate in a C—M—C circuit in the camps, some nascent capitalists do attempt to turn money into a larger sum of money through a variety of means. The store itself, however, is run as a not-for-profit service for the men. Thus, in this narrative, like the last, the emergence of money is explained by a definite, evolutionary, pattern of development. Presumably, once achieved, the money form will remain in place indefinitely.

The Neo-Simmelian Institutional/Network Interpretation: Throughout Radford's account, mention is made of the social conditions existing in the camps, but does not directly tie these conditions to the conduct of exchange. The initial weeks of incarceration in the P.O.W. camps were chaotic. Military chains of command were often broken, units divided up, and the general predictability of day-to-day life entirely disrupted. As a result, many of the social institutions and rules designed to impose order on the lives of the soldiers were also suspended, with life being governed by a few basic principles of survival. The exchange networks connecting these soldiers were sparse and tenuous at best. But routine was quickly established again to the extent possible. One element of the reestablishment of routine was the regular delivery of Red Cross rations. Something never mentioned in Radford's account, but patently obvious, is that nearly every Allied prisoner, to a man, has considerable familiarity with the both the institution of monetary exchange and that of barter, gained throughout his life via exposure to the economies of all of the nations involved in the war. As soon as order is restored a bit, an attempt is made to reestablish such institutions of exchange. The money institution has different requirements than the barter institution, one of which is the universal recognition of a given good as money. For barter to take place, the two parties must each be convinced of the potential use value of the thing they are to receive, the honesty of the exchange partner, assessed through past transactions or by word-of-mouth, and the acceptability of the terms of exchange, to name a few. But, for a money-based exchange to take place, a principal requirement is that the money received, whatever its form, will indeed be honored by the next exchange partner and accepted in the next transaction. The continual movement of men in and out of the camps and through the German P.O.W. system makes such a condition nearly impossible to meet at first; the networks of exchange are constantly being divided into smaller pieces and then recombined. Under these conditions, the men have to content themselves with barter, though they see no problem in at least adopting a uniform unit of account as they are already well-accustomed to such a thing. If someone wishes not to accept such a mutually agreed-upon unit of account, no exchange need occur. But by the same token, if a man wishes to go against the will of the larger network of traders, he is effectively excluded from most exchange opportunities. After several weeks, the men enter a larger, more permanent camp where the men before them, seeking to reestablish many a missing institution, have taken great strides toward the establishment of a full-fledged exchange institution which recognizes cigarettes as the medium of exchange. And here one also sees that the newest actors are again effectively barred from practicing barter if they wish to engage with this larger community which now even includes some of the German captors and townspeople from near the camps.

> As soon as permission can be obtained to start a store (another familiar institution), the men begin to recognize Bully Marks as currency. Now those men who choose not to acknowledge Bully Marks as money face isolation yet again from the principal network of traders – they will be unable to interact with the majority, who will insist that Bully Marks be accepted in exchange, and thus most exchanges will rapidly be drawn under the auspices of the "newly" established institution. Men who commit acts deemed deleterious to trade, such as currency debasement, face exclusion as well, and thus attempts are made to conceal such acts from detection. Central to this narrative is the establishment of a mini-"State" in the form of a network of several hundred or thousand regularly interacting trade partners who all agree that a money symbol – first cigarettes, then Bully Marks – will be accepted as valid. Those who do not embrace the money risk exclusion from the activities of the community. Thus, this is a narrative in which the desire to carry out monetized exchange is already latent in the population (though it is scarcely different should this desire be fully emergent, just slower). As soon as the general conditions of life permit, this population makes creative use of the materials at hand to approximate such a system as best as possible. The passage of time, the strengthening of the individual network ties between actors, and the increasing average density and connectivity of the network(s) as a whole enable the ever-more efficient functioning of the money system.

Evaluation

Consider again the questions of *why* monetization occurs, and what this transition signifies. For the materialist-functionalists, monetization occurs because monetary exchange is simply better than barter: it performs all of those various functions that are ascribed to it and does so better than anything else because of its material properties. But there is no acknowledgment of the social nature of exchange, nor or the sociological processes by which it is determined that monetization should proceed according to one course over all others. For, if money has an objective existence tied to its material properties, then in 100 separate hypothetical P.O.W. camps, one should observe a consistent pattern in which the same exact monetary forms emerge in time, regardless of such factors as what goods are contained in the packages initially, or what particular preferences the men have. Although no such data exist, even the few accounts that exist of a similar nature to that experienced by Radford suggest that uniformity is not the norm. Shapiro, for one, recounts that following WWII, shortages of money throughout Germany led the citizens there to rely on not only cigarettes, but on Cognac as general equivalents (1975:

5-6). Cognac is a strange choice indeed, and a supreme illustration of the difficulty in predicting the precise form that money will take due to the flexibility of the human monetary institution.

For the Marxist, monetization occurs because barter imposes harsh limitations on the type and quantity of exchanges that can occur, a limitation which is overcome as soon as traders have realized first the elementary, then the expanded, the general, and lastly the money form, which they will inexorably accomplish in time. Thus, barter should be rapidly extinguished by higher and more efficient forms of exchange in the Marxist interpretation, just as the word barter disappears from Capital after its opening chapters. But, to the contrary, Radford notes that despite the increasing efficiency of the monetary system that developed, "barter was never extinguished" (1945: 191). This is a point, drawn from careful empirical observations, that is almost universally overlooked in discussions of monetization, in both this and other accounts.

For the newest of the perspectives, there is much to be found in Radford's original account that supports the validity of the new formulation. The following passage contains within it nearly every element of the institutional/network view, though these implications go unrecognized:

> The unity of the market and the prevalence of a single price varied directly with the general level of organization and comfort in the camp. A transit camp was always chaotic and uncomfortable: people were overcrowded, no one knew where anyone else was living, and few took the trouble to find out. Organisation was too slender to include an Exchange and Mart board, and private advertisements were the most that appeared. Consequently, a transit camp was not one market but many (1945: 198).

In those camps with the highest degree of general organization, the P.O.Ws were permitted to develop the most unified markets, the most uniform price systems, and the most refined monetary institutions. What Radford identifies as a market is nothing more than an invisible social network comprised of the ties that exist between individual prisoner-traders. It

would be tempting, therefore to say that the market itself, as the analogue to Marx's "State" is the thing that determines what commodity will serve as the money commodity, but this is a dangerous way to state the situation. In fact, it is the *network* of traders, flesh and blood human beings, that makes such determinations through a highly complex and poorly understood process of collective decision-making. Radford's account provides little insight into the exact network structure of the camps, and so it is entirely possible that the designation of a particular commodity as money took place in many smaller networks with many different results, but that the amalgamation of these networks required some networks, whether the smaller or the less well-organized, to abandon their preferred forms of money.

Perhaps the greatest evidence of the utility of the institutional/network perspective is to be found in the rapidity with which both commodity markets and a full-fledged system of money emerged. Radford is quite explicit: the "lively trade" in cigarettes emerged in less than 1 month, under the most extreme conditions imaginable, in a prison camp, among the soldiers of many nations (1945: 191). Where even language was not shared, money nevertheless enabled the smooth conduct of exchange. What does this suggest with regards to the "spontaneous" generation argument in comparison with an institutional/network interpretation? I would suggest that the swift development of such complex forms of social exchange is more easily explained if one presumes that most if not all of these men, regardless of nationality, were already accustomed to living with a monetary institution. For such a system to emerge *de novo* as it likely has only a few times in history is undoubtedly a much slower and halting process. And yet, this is exactly the interpretation that the materialist-functionalist reading implies.

The materialist-functionalist perspective ignores the behavioral norms, social conventions, and rules (institutions, collectively) that exert control over the use of money, taking

them to be properties of money itself, not of human beings, and therefore leave no role for institutions in the monetization process. The Marxist approach acknowledges that the whole process of monetization is as much a social construct "as language" but provides little critical analysis of the actual role that such institutions play. Only the institutional/network interpretation, grounded in Simmel's work, directs the researcher to examine these institutions themselves as the principal agents of monetization, and specifically identify the nature of the information transmitted through exchange networks as the most important characteristic defining monetized exchange. Moreover, as Zelizer argues (Zelizer 1996), the social institutions surrounding money both *shape* the way money is used, and are *shaped* by newly emergent forms in an interactive process (1989: 342).

The materialist-functionalist perspective similarly fails to acknowledge that all human exchange, including that which occurred in the P.O.W. camps, takes place in the context of human exchange networks. These networks are only implied by the Marxist perspective, and indeed the Simmelian perspective only hints at them. The institutional/network approach suggests, in contrast, that these networks of traders are the social context that enables exchange *of any type* to occur. If even a single transaction is carried out using some form of money, symbolic or commodity, information about that transaction is not limited to the parties involved. It travels throughout the network, altering the information available to everyone else connected in potentially powerful ways. This brings to mind Watkins' (1991) analogy of fertility preferences acting like dye injected into the bloodstream of nations, allowing the researcher to observe the otherwise invisible structure of affiliation, shaped by language, culture, and so forth. For Watkins, such behavior is largely unobservable to the researcher, being passed "over the back fence, or at cafés," but it has the power to reshape nations no less than local exchange

networks (1991: 7). In like fashion, even when these networks are not directly observed, their presence is always felt by virtue of the fact that monetized exchange cannot take place without them.

Beyond these advantages, the new theory also exhibits a unifying effect on the study of monetary instruments: whether an economic community denominates in seashells or Euros is of little importance from a sociological point of view. What matters is that that economic community accepts the symbolic value of the monetary instrument and agrees to honor it at a specific value. In fact, the specific "physical" form that money takes can now be demonstrated to be largely irrelevant to the transactors involved. This is not the case with barter. While the properties of the many forms that money may take do differ, and these have consequences for the efficient flow of all things through the monetary system, they have no relevance whatsoever to the determination of whether a social system is monetized or not. This determination must be made entirely with reference to the social arrangements governing whether a particular entity has been designated as fulfilling the symbolic role that all money, and nothing else, fulfills.

Implications for Level of Analysis, Conceptualization, and Agency

I now return to the general state of sociology literature described at the outset. As I noted in Section II, the lack of a consistent sociological theory of money and monetization has left most researchers to their own devices in attempting to explain the relationship between monetization and their own research topics. In particular, I identified two basic elements that most conceptual definitions should provide: whether the phenomenon is discrete or continuous and the scale at which it operates. I also noted that the former dimension could also be thought of as the temporal scale, while the latter can be conceived of as the spatial scale of the phenomenon. Thus, does the theory promulgated here require us to focus on any one particular level of

temporal or spatial analysis in order to observe this dynamic institutional change? Clearly, the answer to both questions is no. To understand how monetization can be both discrete and continuous and how it can operate at both the micro and macro scales, it is necessary only to apply already well-understood aspects of social network analysis.

As is common in social network analysis, the researcher must *simultaneously* consider both micro-level interactions between actors (dyads) and the nature of the macro-level system (the entire network, or sub-network). Different implications may arise at different levels of analysis. A given exchange is either monetized or it is not, but a given network of exchange partners may display finer gradations of monetization, according to the spread and degree of monetized exchange. In the latter case, the most appropriate way to conceptualize monetization is as an emergent property of the network under consideration. Thus, when discussing a higher-level social group, whether a population, a society, an organization, an economy, or any other, it is generally inappropriate to speak of monetization as a dichotomous type of change, except in the rarest of instances.

Such an approach also re-injects agency into all discussions of monetization. When a nation or economy is *monetized*, the implication is frequently that the people experiencing this change had little choice or direct involvement in the matter – they are portrayed as passive subjects or even as victims. But in treating each individual economic exchange as the building blocks in an analysis of monetization, and the resulting networks as the focal point, the people experiencing the change are reintroduced as sociologically significant. If monetization is a quality of the economic exchange that reflects the choices of the transactors, then it follows, as before, that not all members of a social group need monetize at the same time. Rather than presupposing geographical, sectoral, and social group unity in monetization, this

institutional/network approach allows these characteristics to vary over time and within networks (or societies). The challenge for researchers becomes the determination in a given social context of whether monetization proceeds in a unitary or piecemeal fashion (the *ubiquity* of monetization), the degree of *substitutability* of money and barter, their *complementarity*, and their potential *antagonism* or *competition*. Such a comparative and historical approach to studying monetization, paired with this newly-developed conceptualization, should prove to be a highly productive field of research.

Discussion: Reclaiming Money and Monetization

Throughout this paper, I have juggled two major ideas. First that a better theoretical understanding of money and monetization is possible and necessary, both for its improved utility to theorists and because of the potential such a theory has to support new collaborations between researchers who are studying different aspects of the same core process. And second, that sociology has at least as much of a claim to the study of money and monetization as economics. On this latter point, I have cited sociologists, both classical (Marx 1887; Simmel 2006) and contemporary (Deflem 2003; Dodd 1994; Ingham 1998; Ingham 2000; Keister 1992; Swedberg 1997). It would be nice to see such a point echoed by the author and chief observer for one of the most cherished accounts in economics of the development of money, and in fact, one need look no further than the opening paragraphs of Radford's original paper to find just that:

> Although a P.O.W. camp provides a living example of a simple economy which might be used as an alternative to the Robinson Crusoe economy beloved by the text-books, and its simplicity renders the demonstration of certain economic hypotheses both amusing and instructive, it is suggested that *the principal significance is sociological* (1945: 190, emphasis added).

Here is confirmation of the best possible sort for a central thesis of this paper: the principal significance of monetization is sociological, owing to "…the universality and the spontaneity of this economic life." (1945: 190). Thus there is an even more basic justification for testing this new theory using Radford's account: the universality of the behaviors being described, behaviors that represent responses to equally universal problems of human association. Money, then, is no more or less than a tool brought to bear on very human problems arising out of an unequal distribution of desires. Money was not "created" or "invented" in the case described by Radford, but was rather a well-established aspect of the culture of most if not all of the soldiers confined in the P.O.W. camps. The account is therefore not an account of the "spontaneous" development of money at all, but rather an account of the essential elements that are required for the successful functioning of a monetary institution in a vastly simplified economic and social context. As such it holds much value for sociologists working in a variety of fields.

Of the broader questions posed at the outset, several have now been addressed, while a number represent the new frontiers for research that have been opened up by this theoretical revision. The question of what occurs when exchange becomes monetized has been addressed; it requires nothing less than the creation of an institutional structure, embodied in social networks, that is capable of enforcing the acceptance of some commodity or symbol in exchange for a thing of value. A tentative answer has also been provided to the joint questions about the conditions under which monetized exchange emerges and is extinguished. As Radford's account clearly shows, monetized exchange does not act to regularize and stabilize exchange as is often suggested. Rather, it *requires* such stability and predictability.

Still other questions now take on a much deeper meaning and will hopefully encourage renewed sociological attention to the role that monetization plays in myriad social processes.

Two of the questions posed at the outset are representative of the broader potential for intra- and interdisciplinary connections to be made. First, what other social phenomena are affected by the way social exchange is carried out and how? Arizpe (1981) memorably described monetization as a process having a "ripple effect" in the transitional economies where he observed it taking place (637). Others have echoed this sentiment over time. But monetization has the potential to bring about a corresponding "ripple effect" in the research that is conducted, traveling outward in ever-greater circles and touching upon ever-larger domains. It is my hope that this paper helps to replace the stagnant, critically disengaged approach that currently prevails with a vibrant, healthy scholarly debate about the conceptual and theoretical significance of monetization.

Second, and perhaps most important, what implications might monetary exchange have for the cultural and moral fabric of a village, state, or nation? Such evaluative questions seem far less significant if the focus of monetary theory is on money itself: what significant consequences can the material form that money takes have for questions of value and morality? But, when monetization is re-conceptualized as a shift in the very institutional and network structure of a community, this has far-ranging implications for the way that actors and groups interact with one another. It was these broader implications that drove Marx, Simmel, and their contemporaries to devote considerable attention to the subject, not the "novelty" or "emergence" of money. In an era that witnessed the development of the highest forms of industrial capitalism, these implications were perhaps closer to the surface of human experience. Some 100 years later, they have become no less important, but are perhaps less readily apprehended due to their commonness or their complexity. But a renewed interest in the fundamental theoretical issues surrounding money and monetary exchange, including new empirical attempts to operationalize

and measure the network aspects of this theory, will enable us to once again bring these issues into sharp focus.

TABLE 2.1: Cross-Classification of Articles in Sociology Journals Using Term "Monetization" According to Two Major Conceptual Criteria

	Discrete	Continuous
Micro/ Tangible	• ***gold and silver*** (Carruthers and Babb 1996: 1578; Gideonse 1934: 750) • ***goods*** (Yarros 1915: 331) • ***perks and benefits*** (Bell 1995: 260; Dye 1967: 46; Eaton 1972: 675; Garcelon 1997: 45; McCormick 1960: 366; Oluwu 1999: 5) • ***income*** (Axinn and Levin 1972: 164; Walder 2002: 231) • ***deficits*** (Campbell 1996: 68) • ***taxes and rents*** (Allen 1983: 160; Lachmann 1989: 143; Richards 1981: 297) • ***environmental services*** (Presser 1994: 447) • ***birth and death ceremonies*** (Roitman 1990: 681) • ***agricultural products and surplus*** (Blockmans 1989: 738; Clark 1966: 49) • ***non-market work*** (Benavot 1989: 21; Bernard 1973: 782) • ***legal claims and damages*** (Kritzer 1987: 344-346; Miller and Sarat 1980: 535) • ***human behavioral motives*** (Belcher 1962: 112)	• ***child care arrangements*** (Angrist and Lave 1973: 459) • ***agriculture*** (Clairmonte 1964: 422) • ***taxes*** (Goldstone 1988: 114) • ***earnings*** (Vijverberg 1993: 945) • ***household production*** (Oberschall 1996: 1034) • ***"productive activities"*** (Korzeniewicz and Moran 1997: 1011)
Macro/ Intangible	• ***economies*** (Axinn and Yabiku 2001: 1222, 1229; Brown 1958: 419; Delany 1963: 463; Ramu 1974: 627) • ***economic sectors*** (Crenshaw 1991: 1175; Friedman 1961: 100; Waldinger 1986: 255) • ***markets*** (Goldthorpe 1998: 176; Tilly 1996: 593) • ***societies*** (Lindenberg 1985: 100) • ***nation-states*** (Elder 1976: 220; Munro 1996: 124) • ***empires*** (Spengler 1964: 420-423) • ***capitalism*** (Hass 1999: 387, 391, 400-405, 417, 421) • ***exchange*** (Bornschier, Chase-Dunn, and Rubinson 1978: 677; Chirot 1985: 186; Coleman 1987: 435; Sewell 1992: 26; Thomas and Lauderdale 1988: 388; Weingrod and Morin 1971: 312) • ***value*** (Levine, Carter, and Gorman 1976: 1113) • ***economic activity*** (Campbell 1993: 175) • ***transactions and interactions*** (Borocz and Southworth 1996: 818; Chase-Dunn, Kawano, and Brewer 2000: 82) • ***"labor power"*** (Sitton 1998: 68, 76) • ***"everyday life"*** (de Sardan 1999: 39, 45-46, 50; Tetlock 2000: 317)	• ***economies*** (Cole 1989: 131; Elvin 1984: 382, 385; Engberg 1965: 181; Fahey 1982: 64; Goldstone 1984: 1134; Lenski 1976: 554; Miller 1961: 433) • ***nations*** (Abdel-Salam 1970: 359-361) • ***markets*** (Form 1973: 3) • ***societies*** (Moody 1976: 144, 151; Runiciman 1983: 163, 177; Sacchi 1998: 152, 157-158) • ***marketplaces*** (Fernandez Kelly 1989: 623) • ***rural households*** (Morawska 1989: 266) • ***regions*** (Subrahmanyam 1995: 761) • ***"social relations"*** (Dunning and Mennell 1998: 343-344) • ***exchange*** (Rosenberg 1994: 358) • ***systems for housing provision*** (Bodnar and Borocz 1998: 1281-1282, 1287-1288, 1301) • ***the "commercial base"*** (Collins 1997: 861-862)

CHAPTER 3

SOCIAL NETWORKS AND MONETIZED LABOR

INTRODUCTION

It is the primary task of this paper to continue to fill an empirical gap in the literature about the sociological process that goes by the name of monetization. Using data on labor use in Northeast Thailand, I show that a relationship exists between the use of monetized exchange and the social network characteristics of villages and households. This relationship was predicted by an improved theory of monetization and serves to supplement and extend existing theories of agricultural labor and the economics of exchange. This analysis also improves understanding of a common and vital form of economic exchange in the Southeast Asian context: rice harvest labor. As exploratory research, it highlights the need for more attention, both empirical and theoretical, to be given to understanding what monetization is and how, specifically it can impact the nature of transactions in the many settings where exchange takes place.

The theory developed here is an attempt to better distinguish between traditional in-kind forms of exchange and monetized exchange, using the insights of sociological exchange theory and social network analysis and theory. Five specific hypotheses are derived from the application of this general theory to the context of the rice harvest in Northeastern Thailand. The empirical analysis presented here is wholly consistent with these five theoretical predictions at two very different points in time, supporting the assertion that the theory describes a stable, underlying condition in labor exchange networks, and exchange networks more generally. The specific

conclusions of this analysis should generalize to a much wider range of social and economic contexts, provided that researchers can obtain measures of the relevant aspects of monetization and networks described here, which at present are seldom collected simultaneously.

I take a simple approach to the measurement of "monetization" in this paper, relying on respondent's implicit understanding of the possible forms of exchange available to them, monetized or not. But, at a minimum, three theoretical questions should be addressed. First, what is monetization in this general sense? Second, on what grounds do I anticipate finding a relationship between monetization and such characteristics as network structure and individual network position? This question forms the major part of Section II. Third, does it matter in a practical or theoretical sense whether an exchange is monetized? Is the difference really significant? Opinions on this last question are particularly divided, and often break sharply along disciplinary, even sub-disciplinary lines. Rather than taking a theoretical approach to addressing this third question as I have done elsewhere (Hull 2009a), I use the empirical analysis described in Sections III through V to suggest that different types of exchanges are not equivalent in the context examined here. The implications that such differences may have for the actors involved are described in Section VI, where I also discuss to the broader significance of the findings.

THEORY

What is monetization?

The aim of this section is to generate specific hypotheses about the relationship between monetization and social structure, as explicitly measured using social network analysis. I begin by providing a brief answer to the first question posed above (for more detail, see Dodd 1994; Hull 2009a; Smithin 2000b). I then provide a thorough discussion of the second question. Lastly,

I state the hypotheses that derive from this discussion formally before proceeding to the analysis and an answer to the third question.

Monetization is traditionally defined as a shift from barter to money as the means of carrying out exchange (Dobeck and Elliot 2007; Kemmerer 1935; Shapiro 1975). In this conventional conceptualization, money is viewed as a technology with numerous properties and functions, each of which describe the thing that is money itself, rather than the social arrangements that make monetary exchange possible (Hull 2009a). In contrast, I conceptualize monetization here as a shift in the institutional and network structures that pertain to social exchange, and not as the simple introduction of money as a technology into an economy. The introduction of money requires very specific institutions to be in place in order to support its use. These institutional structures differ in fundamental ways from the more limited institutional arrangements that are required for the smooth functioning of a barter and in-kind exchange system. Barter can take place between two parties in comparative isolation from the broader influence of a social system, but money transactions have an inherent and permanent social character. When the social significance of money is ignored or given only passing mention, the resulting discussions of monetization and its relation to other phenomena often fail to capture the many complex interactions and shifts that are likely occurring as both precursors and responses to the introduction of money precisely because these are *social* things.

Secondly, I conceptualize monetization as a multi-scale phenomenon, discrete at the smallest scale of individual exchanges, and continuous at larger scales such as villages, sectors, economies, or societies. Individual actors can carry on cash-based exchanges in some cases and not in others, especially when these exchanges are of a qualitatively different nature, and evidence suggests that this occurs in various economic sectors of even the most developed

nations (Zelizer 1996). Even restricting attention to a single type of transaction such as labor exchange during a harvest, it remains possible for a single actor to mix strategies, paying some associates and bartering or exchanging in-kind with others. At the level of a collection of actors, the network, it becomes more plausible still that a multiplicity of modes of exchange might be observed, and one may begin to observe specific communities or sub-networks of interaction develop around particular types of transactions, one set of actors engaged in monetized transactions, another bartering. This is an important element to the proper conceptualization of monetization, one that has often been neglected by researchers who prefer to conceptualize monetization as an all-or-nothing proposition (Hull 2009a).

Monetization, Information, and Trust

INFORMATION. In order to fully understand why a relationship is hypothesized to exist between monetization and social networks, one must consider the significance of trust in matters of exchange, a connection that has heretofore gone largely unexplored in the literatures on trust, exchange, and money considered in isolation from each other. In brief, monetization involves a reduction in the uncertainty that is borne by at least one of the parties to an exchange, and therefore has the potential to reshape networks of exchange affiliation as actors respond to the changing informational requirements of a new form of exchange. Where both forms of exchange, monetized and non-monetized, exist side-by-side, one should also expect to observe different characteristics in the network structure associated with each type of exchange.

To understand why these expectations are reasonable, begin by considering that exchange without money is fundamentally dyadic in principle, and often in reality. Such exchanges may involve more than two parties, of course, and may be spread across time in what constitutes a series of “embedded” exchanges that are only commensurate on average (Granovetter 1985;

Sahlins 1968; Sahlins 1972). But in the absence of money, these exchanges involve only the actors themselves, who bear total responsibility for determining essential information about the goods involved (both immediately perceivable and knowable only through experience with the good over time), characteristics of the transaction itself (price, conditions of payment, and so forth), and familiarity with the actors (such as reputation for fairness, and degree of trust) (Dodd 1994; Plattner 1989). Dowling has labeled the totality of these informational requirements the *caveat mutator* burden – the "barterer beware" burden, a variation of the well-known Latin idiom *caveat emptor*, meaning "buyer beware" (1979). [1]

The major source that actors may avail themselves of in order to obtain the information upon which a successful transaction depends is to be found in the existing networks of social affiliation and exchange. Actors to whom an individual is connected through previous dealings may be able to provide important information about past dealings with a potential new exchange partner, while an individual's own past dealings with a certain actor may also be conceptualized in formal network terms as the strength or frequency of past interaction, and even the outcome of such interaction. Individuals may also utilize networks to share or even manipulate information about their own reputations as traders. But, regardless of where information about possible exchange partners is obtained, the locus of responsibility in non-monetized transactions such as barter always lies almost entirely with the actors involved in the exchange. In a monetized exchange, by contrast, the two parties remain embedded in some larger social context, but this context now contains within it additional social institutional machinery for enforcing or guaranteeing the payment of some set value in exchange for money, whether bone, metal, paper, or electronic bit. The presence of this monetary institution, when it is properly functioning, engenders trust in the social symbol that is money, enabling the smooth conduct of transactions,

[1] A more general and accurate translation of Dowling's phrase might be the "exchanger beware" burden.

large and small. In order to better understand the significance of these observations, it is useful to consider more closely what is meant by the concept of trust and how this concept relates to information and social networks.

THE ROLE OF TRUST. Trust originates as a response to uncertainty. Bhattacharya, Devinney, and Pillutla provide a useful definition of trust as,

> …an expectancy of positive (or nonnegative) outcomes that one can receive based on the expected action of another party in an interaction characterized by uncertainty. (1998: 462).

Where the interaction involves the exchange of things of value, a certain amount of uncertainty is almost always present. The "expected action of another party" derives directly from the information amassed on a potential exchange partner, whether voluminous or slim. To place one's trust in an exchange partner is to put one's imprimatur on the exchange, a symbolic gesture that declares the *caveat mutator* burden has been fulfilled and the trade partner deemed worthy and reliable enough, and the goods or services of sufficient perceived quality, to carry out a transaction.

Granovetter (1985) argues that it is trust that imbues economic exchanges with a social character and yet keeps them from becoming over-socialized to the point of determinism (487-493). Humans do cheat their exchange partners, but such behavior is not normative and is typically punished when discovered. Those who break this trust frequently will be deemed untrustworthy by those who have been cheated and often word goes out to other potential exchange partners to avoid dealing with this actor. Whether this actor is an individual or an entire corporate entity makes little difference. Stronger bonds of trust may therefore develop between actors when exchange is carried out informally, not because of any inherent difference

in the economic relationship itself but because of the greater tendency for information about such transactions to be shared widely among other close associates (Molm, Takahashi, and Peterson 2000). Such casual and ongoing associations provide frequent occasions for the actors to demonstrate to each other that they can be trusted.

All exchanges, whether large or small, in anonymous markets or intimate village settings, take place within a context of uncertainty, and therefore require some form of trust. But what specific type of trust is required in a monetized context? To accept a bit of metal, scrap of paper, or collection of binary bits in exchange for one's labor, the product of one's hands or mind, or some other thing of value requires a considerable leap of faith. The difference is that, unlike non-monetized transactions, in which only the trustworthiness of the potential exchange partner and the quality of the thing received must be evaluated, in monetized transactions it is the State, or equivalent social institution, that must also be trusted. Trust must be invested, quite literally, in money itself, in the monetary system. While it is true that hyperinflation and other problems of monetary systems introduce interesting additional wrinkles into the formulation, the essential observation is that monetization shifts responsibility for obtaining some (but not all) of the required information in an exchange from the transactors to social organizations (be they chiefs, guilds, central banks, nation-states, etc.). Thus, when a shift occurs from non-monetized to monetized systems of exchange, the nature and distribution of the trust required by the transaction is also shifts.

One implication of this transfer of trust from person to institution is straightforward: an institution must only gain one's trust once, and barring the widespread failure of that institution (rapid currency devaluation being an excellent example) quickly ceases to evoke suspicion and remains trusted indefinitely. In contrast, each new party to barter requires that the process be

undertaken anew, and even trusted long-term partners occasionally perform unscrupulous acts. It is this tendency for the machinery of trust to rapidly fade from perception in the course of monetized exchange, and to remain ever present in barter, that leads to the erroneous conclusion that barter requires greater levels of trust than monetized exchange. To use money requires not *less* trust, but *more*, though it is trust directed towards a very different entity (Dodd 1994: xxv).

In an exchange transaction in which one of the actors pays money for a good, the *caveat mutator* burden is substantially altered, but only for one party. To illustrate, first imagine a simple exchange: the direct bartering of agricultural produce for other produce, say oranges for flour. In such an exchange both parties bear the *caveat mutator* burden to similar degrees – Actor "A" presumably does not wish to procure a bag of sour oranges, nor "B" a bag of moldy flour. Thus, all of the elements of the social relationship in which the exchange is embedded, as well as the powers of observation each actor possesses will be called upon by both parties to protect their interests as best they can. If A and B have already established trust based on previous exchanges or information from their network, and they can meet the other elements of the *caveat mutator* burden, there is a good chance that an exchange will take place. Even if actor B should intend to cheat A by attempting to hide rotten oranges in the bottom of the bag, this actor still would not wish a similar thing to happen in return as regards the flour. In other words, even a potential cheater is subject to the *caveat mutator* burden to an equal degree under barter, and cannot afford to be any less vigilant. In contrast, if one is offered an equivalent amount of money as payment in exchange for goods, services, or other valued things there is a higher probability that the *caveat mutator* burden will be met for that person because the money is trusted, *ipso facto*. Even taking into account such factors as the risk of counterfeit, the introduction of money typically reduces the *caveat mutator* burden for the "sellers" of things of value below what it would be

under a direct barter system. For the "buyers" of things of value, the burden remains largely unchanged.[2]

It is thus no accident that *caveat emptor* is a widespread idiom in market economies while *caveat venditor* (seller beware) is seldom heard. As one example supporting this theory, DiMaggio and Louch have found that U.S. consumers prefer to buy an automobile from someone whom they know well, and sell to someone whom they do not. In their words,

> The greater the risk in a transaction—the greater the advantages that information asymmetry and asset specificity bestow on sellers and the greater the seller's inclination to exploit those advantages—the greater the likelihood that buyers will prefer dealing with people to whom they have social ties outside the transaction itself" (DiMaggio and Louch 1998: 634).

Such behavior can be interpreted as a reflection of the trust requirements of exchange. The buyer bears responsibility for assessing conditions of the exchange such as the seller's "inclination to exploit," which are seldom precisely known in practice. Thus, when assuming the role of the buyer, the *caveat mutator* burden leads actors to express a preference for dealing with those about whom they can obtain the most information through other social network ties. The possibility of a buyer cheating, on the other hand, is substantially reduced (although not eliminated) through the introduction of money into the exchange. Thus consumers, when assuming the role of the seller, might be thought to show no preference at all for whom they sell to. But of course information can flow both ways through a network, and perhaps to reduce the likelihood of friction within one's own social group, or simply to make it more difficult for the

[2] Although considerably beyond the scope of the present analysis, it is worth noting that the last remaining possibility – the exchange of one monetary instrument for another, reestablishes a degree of parity between the parties involved. But, simultaneously, the consideration of this large class of economic transactions readily points to the simplified nature of the model presented here, as clearly not all monetary instruments are created equal.

buyer to later complain about the purchased car, sellers in practice display a preference for dealing with strangers.

Moving from the general to the specific, it should now be apparent that in a fully non-monetized exchange environment, buying, selling, and exchanging households all share similar *caveat mutator* burdens. Each time objects or services of value are exchanged both parties must satisfy these informational requirements. They must trust one another. In the specific case of labor exchange, a common feature in many agricultural and subsistence economies, one would therefore predict that households will exhibit a preference for exchanging labor-for-labor with associates who are trusted. Such trust may be based upon assessments of the work habits, reliability, and familiarity obtained through personal experience or through word-of-mouth from other members of a social network. An actor might actually prefer associates with whom they share no close connections, but if non-monetized exchange is being used, such a preference is trumped by the difficulty of satisfying the *caveat mutator* burden where strangers are concerned. Only when local labor sources are exhausted might one expect to see households turning to associates that are distant and unknown to them as a labor source of last resort in the absence of monetary exchange.

One special aspect of labor-for-labor transactions that further supports this prediction is that one party must always "ante up" first, with repayment in kind being delayed for some time. Labor obtained through exchange is *extra* labor, in addition to what is provided by one's own household, which must also work to harvest one's own land and therefore cannot simultaneously be providing labor elsewhere. Thus, whichever party assumes the role of first provider is in a particularly vulnerable position, as there is a risk that the exchange partner will renege on the deal, or will attempt to cheat by repaying the debt with less labor than was received. For the

party that goes first in such exchanges, money transactions should have an immediate, readily apparent advantage over other types of exchange. If these actors are compensated monetarily for their labor, they need have fewer worries that they will be cheated or swindled by an exchange partner who fails to follow through with the promise of future labor. Trust in the money itself, established long before, and remaining inviolable except in periods of monetary crisis, will be sufficient to guarantee that concerns about cheating are allayed and an exchange will take place, other factors being equal.

Thus, money makes it possible for those who wish to obtain money to sell their labor to comparative strangers without the need to satisfy an otherwise sizeable *caveat mutator* burden. To be sure, theirs is still far from a worry-free existence. For one, they could be exploited or underpaid by their employers. As noted earlier, there is no escaping the requirement of trust altogether, it is simply shifted to qualitatively different concerns. This is the place where the present theory connects with fields that study labor contracts, for example. But, at the heart of the discussion is the observation that different expectations characterize monetized transactions where buyers and sellers of labor are concerned. In contrast to the sellers, actors who are in need of labor still have the same *caveat mutator* burden that they have always borne. These "employers" must continue to assess the characteristics of the worker and the service being rendered as best they can and retain the incentive to deal with better-known exchange partners, expressed as preference for hiring only laborers whom they trust to a high degree, just as they did in a non-monetized institutional environment. From these general observations, a number of specific predictions, formulated in explicit social network language, can now be deduced.

Social Network Hypotheses

The advent of social network analysis has provided a methodology and a language permitting the specification and measurement of the types of social relationships and information flows discussed above in explicit terms (Burt 1976). Therefore, a number of specific social network hypotheses can be expressed that formalize and extend the preceding discussion.

First, greater concentrations or frequency of ties between actors in local social networks ought to make the exchange of labor through non-monetary means less risky than it would be in sparse networks, *ceteris paribus*. Conversely, in networks in which the frequency or concentration of local network ties is lower, one might expect to see a heightened reliance on monetized labor because such an arrangement reduces the informational burden for at least some parties. The story is likely complicated considerably by such factors as access to money and the availability of labor of different types (well-known vs. not, for example), but these factors should not fundamentally alter the basic existence of a relationship between these two characteristics of networks. Because there is currently no empirical basis to suggest which formal measures of network structure might be the appropriate means of operationalizing the "concentration and frequency" of ties, a broad sample of common network measures is used.

Secondly, a relationship between monetization and network characteristics should only be expected for those specific network ties that are reasonably capable of providing information relevant to the type of transaction under consideration. Put simply, different types of networks should provide information that is useful to meeting the *caveat mutator* burden for different types of transactions. As noted in the introduction, I will be using the specific example of rice labor exchanges to formally examine these predictions. This proposition is examined by comparing the correlation between monetization and essential aspects of two different types of

social networks: rice labor networks and sibling networks. These two networks show very little overlap, or multiplexity, in the context of the study (Entwisle et al. 2007). Examining these two networks side-by-side enables me to provide some support for the contention that it is specific information pertaining to trust and the expected value of the transaction (collectively, the *caveat mutator* burden), and not simply the general degree of connectedness, that accounts for the observed association.

Third, I expect to detect the informational asymmetry discussed above. If it is in fact the case that labor providers and labor users have similar informational requirements in non-monetized exchanges and different requirements when the transactions are monetized, this might be expected to manifest itself in the strength and type of the relationship observed based on which end of the transaction an actor occupies. Specifically, one would expect to find that labor users are more attentive to information about the potential trade partner than labor providers when monetized transactions are taking place, while these two ought to appear similar for non-monetized exchanges.

Fourth, as noted earlier, I conceptualize monetization as a multi-scale phenomenon, one in which actors may potentially mix exchange strategies at all but the lowest level of the single transaction, at least in principle. Empirically, two questions should be addressed. How common is such mixing of strategies in practice, and if it does occur do the actors or collectivities mixing those strategies more resemble those who are fully monetized or fully non-monetized. I predict that in their network positions and properties, actors using both types of exchange will more resemble their fellows who use only non-monetized labor. Following the logic of the foregoing discussion, this is because even one such non-monetized transaction requires considerable social network resources to be utilized in meeting the *caveat mutator* burden.

Fifth, and of particular importance to the theory presented above, I expect there to be a readily apparent relation between the general degree of familiarity existing between two parties and the form of exchange used. To the extent that a defensible measure of this familiarity can be constructed to adequately capture the essential element of trust, I expect to observe the tendency toward monetized transactions to decrease with familiarity. More will be said about this hypothesis when the specific concepts laid out in this section are operationalized in Section IV. Likewise, all of these hypotheses will receive additional refinement as the specific data and measures used in the empirical analysis are now described.

CONTEXT AND DATA

Nang Rong District, Thailand

The data used to explore the relationship between social network characteristics and monetization of labor come from the Nang Rong Projects, a large collection of studies examining social, demographic, and environmental conditions in Nang Rong, Thailand over a span of more than 20 years.[3] This analysis makes use of the two most comprehensive data collection efforts, fielded in 1994 and 2000, as well as some information collected in 1984. During each wave, an attempt was made to collect a complete census in 51 villages resulting in a large total numbers of individuals (ranging from 34,035 in 1984 to 33,193 in 2000) and households (ranging from 5,860 households in 1984 to 8,638 in 2000). This, combined with the broad range of thematic areas about which information was collected, and the multilevel structure of the data, make these data ideal for secondary data analysis. The present research examines two previously well-studied aspects of the datasets simultaneously: the structure of particular social networks (e.g. Entwisle et al. 1993; Entwisle et al. 2007; Faust et al. 1999; Godley 2001; Rindfuss et al. 2004), and the pattern of household labor compensation (e.g. Hull 2007). These subject areas and the data

[3] For a complete description and access to the Nang Rong data, visit http://www.cpc.unc.edu/projects/nangrong.

collected for their investigation are combined in a novel way to yield new insights about the relationship between social networks and labor exchange.

Nang Rong District, Thailand is an undulating expanse of land in Northeast Thailand that is noted for both its high levels of traditional smallholder agriculture (Phongphit and Hewison 2001) and for its traditionally high levels of poverty (Dohrs 1988: 12-13; Parnwell 1988). This poverty is attributable in part to the unpredictable monsoon rainfall in the region, upon which the livelihoods of many resident farmers vitally depend, and to the poor soils and drainage (Fukui 1993). Agriculturally speaking, at least two such livelihoods are available: wetland (or "paddy") rice agriculture, which is mostly rain fed; and upland cash cropping, which has included the growing of cassava, kenaf, sugarcane, and other "field crops" at different historical periods. Many households in the region also practice strategies of economic diversification, managing "diverse portfolios" that help to buffer the effects of potentially disastrous events like drought, flooding, and the destruction of a specific crop by pests (Grandstaff 1992). Beyond agriculture, few economic options other than out-migration have presented themselves to residents of the District in the past. Development projects such as the Community-Based Integrated Rural Development projects, CBIRD-I and CBIRD-II, helped during the 1980s and 1990s to increase the number of locally available non-agricultural jobs and made other substantial contributions to the economic opportunities available to Nang Rong residents (Canadian International Development Agency 2006; David and Viravaidya 1986; Entwisle et al. 1998; Stoeckel et al. 1986).

For the large share of households that do grow rice, obtaining enough labor to complete the harvest in a reasonable length of time is a perennial challenge. Many developing regions are characterized by surplus labor for agricultural tasks (or assumed to be so in economic theories of

development), and this situation is typically exacerbated by mechanization of tasks and agricultural intensification, which have the effect of further reducing labor demand relative to supply. Nang Rong, in contrast, continues to experience high demand for agricultural labor, at least seasonally. This demand is at its greatest during the rice harvest, when a perfect storm of factors including the unpredictability of late-season rains, the persistent threat of animal and insect pests, and the requirement of processing mature rice in a timely fashion all pressure households to harvest their rice as quickly as possible (Hull 2007). The result is more work at harvest time than can typically be accomplished by the average household in a timely fashion. This imbalance has only worsened as average household sizes have declined over the past two decades (Entwisle et al. 2008; Piotrowski 2008b).

To meet labor demands that frequently exceed the resources of the immediate family, most rice-growing households in Northeast Thailand have a variety of sources from which to obtain the needed additional labor. Households may call upon former members now living in the same or a nearby village along with their spouses, children, and other family members. Former members are usually the children or siblings of household heads who have moved out as a result of marriage or an improvement in the economic standing of the household that allows large extended families to fission into smaller nuclear households (Piotrowski 2008b). The practice of "lucrilocality", in which newlywed couples choose to live with whichever partner's family provides the greatest potential opportunities in terms of land and other assets, means that couples in the Thai context may move into either maternal and paternal homes or found their own households (Chamratrithirong, Morgan, and Rindfuss 1988). Households also receive labor from returning migrants from the household who have been living away from the household for some

time (defined as at least 2 months in this study) but who return to assist the family during the harvest (Piotrowski 2008a).

Together these individuals provide a substantial amount of labor for households. In 1994, the only year for which data on the number of days of labor provided was collected, these individuals provided about 23 percent of the total person-days of additional labor used by households.[4] These workers are connected to the household through ties of kinship, and are quite often also connected through long-established patterns of interaction with the household. As a consequence, the vast majority (around 90-97 percent) of this labor is provided for free or on an exchange basis (often simply a day for a day). For the remaining 77 percent of the person-days of labor utilized in that year, households had to seek out additional labor for the harvest from neighbors and fellow villagers, individuals and associates from nearby villages, and even near-total strangers, possibly provided by roaming labor gangs that sometimes show up at harvest time. In contrast to the current, former, and returning household members, these more socially distant laborers are most frequently remunerated in cash for their labor.

This was not always the case in Nang Rong, however. While no empirical evidence on the method of compensating rice harvest laborers exists for the region prior to 1994, historical reports from the area note a very different strategy was once popular throughout the Northeast of Thailand. The *long khaek* strategy, as it is called in Thai, is essentially a barter-based labor-exchange system. Households in a village pool their labor, collectively harvesting each household's rice paddies in succession as they reach maturity. Cultural, agricultural, and biophysical factors, many of them unique to the region, combined to make this a highly efficient

[4] 124,003 person-days of labor in total were reported in 1994. This number only includes labor from former, returning, and non-household members. The number of person-days of labor provided by current household members was not measured. It should be added that the validity of these estimates may somewhat questionable due to recall and other forms of error. Hence, they are only provided to give a sense of the rough distribution of household vs. non-household labor and not incorporated into the formal analysis.

strategy for ensuring that the maximum amount of rice is harvested while minimizing losses in years past (2007). At the core of this strategy's effectiveness is the staggered maturation of rice paddies which occurs both between households and even among a household's multiple paddies. This variation results from exogenous factors, such as small-scale variation in growing conditions, but is also intentionally promoted by households through the planting of diverse varieties of rice with different growth characteristics, varying planting dates, and the spatial separation of growing plots to maximize the variation for each household (2007). The consequence of all of this variation is that it is possible for households to send members elsewhere to assist with another household's harvest without endangering their own crop.

The *long khaek* system was long the standard means of acquiring additional labor beyond what could be provided by the current, former, and returning household members. But recent decades have seen the system supplanted by one of labor for monetary pay. Phongphit and Hewison summarize the demise of this system succinctly, stating,

> Traditional co-operation, called *long khaek*, where villagers helped one another on special occasions, has disappeared in most villages. Villagers used to assist each other during various stages of rice growing, especially in transplanting, harvesting, and threshing. These days most have to rely on their family and hired labor….In cases where villagers continue to exchange labor, more careful calculations are involved than was previously the norm. If a person has gone to work for two days in someone else's fields, then that person will "re-pay" with an equal period of work. (2001: 103)

Despite the existence of "cash for labor" arrangements for well over 30 years, households in Nang Rong continue to report that between 10 and 30 percent of the laborers not directly affiliated with the household continue to work for "free" or exchange. It is this simultaneous coexistence of an in-kind exchange-based system of labor with a cash-based monetized system of labor that forms the contextual basis for the present study.

Units of Analysis and Sample

The variables created for this analysis are measured at two levels: the household and the village. Doing so enables me to examine the multilevel nature of monetization. Elsewhere I have provided a thorough discussion of the multilevel nature of monetization as a social phenomenon, which can be summarized in the statement that theory predicts different properties and relationships at different scales (Hull 2009a). The definition of a household used here identifies groups of individuals who share a common dwelling unit and engage in a variety of activities in a common location, most notably sleeping under the same roof. This operationalization of households presents few problems for this analysis due to the reliance chiefly on "true" household measures: those that are characteristics of the household unit itself, and not simply aggregate measures or averages of the characteristics of the household members which could be particularly sensitive to the inclusion and exclusion of members. The implication is less potential for variation to be introduced into the measurement of these phenomena by the operationalization of the household.

The sample of households to be used in this analysis, and thus the households used to construct village-level measures, is not the full 7331 households in 1994 or 8638 households in 2000. There are several factors that diminish the total set of households included in this analysis of labor use. First, the household must have harvested rice in order to be able to use any labor during the harvest. Removing those households from the sample who did not grow any rice reduces the number of households included to 5835 in 1994 and 6389 in 2000. Further, of those who harvested rice, a portion relied on only current or former household members to meet their labor needs, and chose not to or did not have the ability to hire or exchange for extra labor. Both paid labor transactions and labor exchanges occur almost exclusively in the act of obtaining *extra*

labor, above and beyond what is provided by the household itself. For this reason, households that did not utilize any extra labor offer no direct insight into the hypotheses examined here because they neither hired nor exchanged for any additional labor. Moreover, as will be explored further in the discussion in Section VI, attempting to include households that neither grew rice nor used any extra labor in the analysis only results in a fundamentally different set of questions about exchange than those addressed here. For now, I define the sample for this analysis to be all households that used at least one laborer that was not a current or former household member under the definitions provided above. Using this standard further reduces the sample to 2007 in 1994 and 4081 in 2000. The selection implications of this decision are explored in Section VI as well.

In contrast, the village level poses few challenges in selecting the proper sample – all 51 villages about which information was obtained are included, with one exception described later. The extent of each village is defined with respect to the original 51 villages chosen to participate in the 1984 Nang Rong study. While many of these villages have subsequently undergone administrative splitting, all data for the "daughter" villages are kept as a single unit, or "mother village."[5] Doing so reduces concerns about the arbitrariness of the administrative village definition because two households that were part of the same social and economic community before and after an administrative split placed them into different villages will continue to be recognized as part of the same community(Entwisle et al. 2008). As a practical matter, I go back as far as is possible, using the social boundaries of villages as constituted in 1984 to represent a "village" in this study. One important benefit of doing so is a consistent frame of reference when

[5] From the original 51 villages selected to field the Nang Rong study in 1984, 92 administrative villages had emerged by 2000 through a process of administrative splitting. When a village grows to a certain extent (there is no precise upper threshold), it is "split" into two villages, each designating a separate village headman and other administrative apparatus, and functioning as a unique entity in the eyes of government agencies. Spatially and in network terms, the daughter villages are often much more difficult to distinguish.

comparing 1994 data to 2000 data. While the exact composition of the villages with regard to households, territorial control, and many other factors is constantly shifting, the operationalization used here ensures that the social entity labeled "Village X" in 1994 is as close as practically possible to that labeled "Village X" in the year 2000.

MEASUREMENT AND METHODS

Variable Descriptions

HOUSEHOLD LEVEL MEASURES. The household-level network measures serve as the basis for both household and village variables, and so are described first. There are three groups of measures. The first two groups are derived from a series of questions asked of each household regarding the source of any labor that it utilized in the course of harvesting its rice. This source information details which other households from within the same village assisted with the harvest, how many laborers helped from each household, and the precise location of each household. In addition, the economic nature of the exchange – whether for pay, free, or exchange, was also recorded. From these extremely detailed raw data the first group of measures is created by instituting two dichotomies.

First, labor was either paid or not, which treats households that reported exchanging labor as theoretically similar to those reporting receiving labor for free. There are reasons to doubt that households consistently distinguished between free labor and exchange labor, most notably the observation that most "free" labor in fact takes part in the context of a long-term relationship between households that is similar to labor exchange (Hull 2007). Households seldom if ever provide free labor to those they do not regularly interact with.[6]

[6] One notable exception to this comes from evidence that some village headman and religious leaders may receive a non-trivial amount of "free" labor from households in their village, but this "tribute labor" also resembles a barter-like transaction much more than it resembles a market-based cash transaction, and thus can be grouped in the latter category as well {{3 Phongphit, S. 2001/f: 103/s103}}.

Second, labor is classified as either from within the village or from beyond. Using the 1984 village definitions, all labor provided to the household was categorized according to its source. Initially, categories included from the same village, another village in Nang Rong, another district in Buriram Province, another Province, and another country. Much of the small share of labor that is provided to a household from far away (such as that from another district or province) is provided by persons with whom the household shares strong bonds of kinship or other affiliation, and is not contract labor. Descriptive analyses not shown here corroborate this assertion, showing that as one moves farther beyond the village in spatial terms, the proportion of workers that was paid actually declines to a level nearly identical to the level observed for former household members. The conclusion to be drawn is that outside the District, spatial distance is not a particularly useful proxy for social distance or familiarity. This is the principal reason for dichotomizing this measure.

Based upon these two dichotomies, all labor used by a household is categorized, and indicator variables are created that denote whether a household had used any labor of each type: paid, free/exchange, within village, and beyond village. For each indicator variables, a household can have a 0 (no) or a 1 (yes) for each of the two categories in a dichotomy. For example, a household that mixed compensation strategies, paying some workers and not others, would have a 1 for both “any paid” and “any free/exchange.” A household that paid all of its workers would have a 1 for “any paid” and a 0 for “any free/exchange.” Thus, two sets of four indicator variables exist: one set dealing with compensation and the other with the origin of the labor. These sets of dichotomous indicator variables are the first group of household variables.[7]

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[7] Due to the way the analysis sample is defined, only three of the four categories in each set will appear in the tables shown. The fourth possible category – used no paid labor (0) and no exchange labor (0) and its "within the village/outside the village" analog – has no cases because these households are excluded from the analysis.

The second group of household variables is generated using data on the within-village rice harvest network. Complete and accurate data on social networks are typically quite costly and time-consuming to collect, and in this case, it was simply prohibitive to collect complete rice harvest network data beyond the villages. Instead, full network information was collected for all households in the village, and partial information from beyond, in the form of limited out-ties (instances in which a household named another household as having provided assistance with the rice harvest).[8] In formal network terms, I begin with the non-symmetrical adjacency matrix of within-village household rice harvest affiliations, an n x n matrix in which the entries on the horizontal represent a household's out-ties (other households named as providing labor) and those entries on the horizontal represent a household's in-ties (households that named the ego household as a labor provider). Using these matrices, a number of household-level measures are generated for each rice-growing household.[9] These include the degree (the total number of connections), out-degree, in-degree, total number of households reachable by a path of any length, and the average pathlength between the ego household and all other households. In calculating the path length measures for the rice harvest networks, the directionality of the tie is ignored. It is also possible for households to have "self-reflexive" rice harvest labor ties, which are comprised of former members of the household who came back to assist the household with its labor. These members provide a substantial amount of labor to the household, nearly all of which is free, but the presence or absence of these self-reflexive ties has no impact on the

[8] In fact, out-ties were only collected within the village as well, but because this information was obtained from every household in the village, the result is a complete network, in principle.

[9] All social network measures were created using UCINET {{1 Borgatti, S.P. 2002}} and subsequently exported for analysis in standard statistical software packages (SAS and STATA).

position of the household in the village network that was measured. Therefore, they are excluded from social network calculations throughout this paper as a potential confounding factor.

The third group of household-level measures is also a set of social network measures, and is identical in construction to the second set, but is calculated for the network of sibling affiliations of household members. For all household members aged 18-41, a complete list of siblings was collected, along with information on the present location of each sibling. Using the data on siblings living in the same village, a complete network of within-village sibling affiliations is constructed.[10] For comparative consistency, the same sample of households is used to calculate these sibling network measures that were used to calculate the rice harvest measures.

VILLAGE LEVEL MEASURES. The first set of variables of interest at the village level is the proportion of households in each village that utilized any of each of four possible types of extra labor: paid, free/exchange, intra-village, and extra-village. These are aggregate variables. Each measure is the number of households in a village using labor of a given type divided by the number of households that used any extra labor during the season in question. In addition to the proportion variables, two other sets of village-level measures are employed. The first is a set of

[10] Unlike the rice harvest network, which is directional, this is an undirected network, meaning that if A is sibling to B, then B is also a sibling to A. The structure of the data would therefore permit an analysis of the degree to which siblings in separate households name each other (reciprocal ties). While this is beyond the scope of the present analysis, informal review of the data suggests a non-trivial degree of non-reciprocity exists in the sibling networks (perhaps as high as 60 percent of all sibling ties are not reciprocated). That respondents are seemingly not recalling all of their siblings could be interpreted as evidence of error in respondent recall and other types of error, but is more likely attributable to the key informant format of the data collection. A widespread practice in large-scale household surveys, the use of a key informant allows for information to be collected on individuals who are members of the household but are not present at the time of the interview. Such individuals constitute a large share of the overall population the results are thought to represent. One interpretation of the low rate of reciprocity among sibling ties is that key informants are likely not reporting fully on the siblings of other adult members of the household who are not present during the actual interview. Fortunately, a considerable portion of these missed ties will be reported by the other household, enough that the sibling networks generated are fairly complete despite this potential non-reporting, but the possibility remains that the sibling networks produced via this data collection method may exhibit a degree of missing data whose exact magnitude cannot be determined. If one presumes that the key informant was one who was most familiar with key household decisions such as the acquisition of extra help during the rice harvest, the same should not hold true for the rice-harvest network data.

social network indices that summarize the global characteristics of the labor-sharing network within the village. The second is an identical set of social network indices that summarize the global characteristics of the sibling network in the same village. As these two sets of measures were created in identical ways, I describe only the creation of the rice harvest social network measures.

Whenever possible, an attempt was made to create an aggregate or global network measure to parallel those created at the household level. This enables a direct comparison of effects across levels, and the exploration of the effect of aggregating household-level attributes. Therefore, the mean degree, mean number reachable, and mean path length were calculated for each village network. At the village level there is no need to additionally calculate the mean number of in-ties and out-ties, as these two means will be equal to one another and to the mean number of symmetrical ties, a result of the data structure. Additional measures of the density of the village network (a measure of the total number of ties divided by the total number of ties possible in the network) and Freeman degree centralization (a measure of the concentration of structurally advantaged positions in the overall network) are calculated (Wasserman and Faust 1994). Together, these common social network measures provide a simple characterization of each village network that captures many of its most salient features.

Methodology

I rely on basic descriptive methods to establish the existence of correlations between monetization at the household and village level and several characteristics of two key social networks in Nang Rong, Thailand. A description of the specific methodological issues that arise in an analysis of this type follows.

CORRELATION ANALYSIS. Pearson's r is computed and reported throughout this analysis as a means of establishing association between variables, both continuous and dichotomous. Technically, a special form of correlation, the point-biserial, is more appropriate in instances in which the association sought is between a continuous and a dichotomous variable (Chen and Popovich 2002). A special case of Pearson correlation, this measure has fallen out of favor in the computer era, however, because it can be easily shown that the point biserial correlation is functionally indistinguishable from the more common Pearson's r except in the rarest of cases, typically when sample sizes are below 30 (e.g. Anderson 1994). Thus the equivalent point-biserial correlation can be computed using any program that computes Pearson's r (Klugh 1986).

But, as a result of including dichotomies in the analysis, the r statistic derived cannot assume the full range of values (-1, 1) as would be the case for a Pearson correlation between two continuous variables. Rather, the maximum range that the statistic can take in this case is (-0.798, 0.798), achievable only when the dichotomous variable divides the sample into equal-sized groups. This value decreases further as the dichotomy becomes more imbalanced to as little as (-0.26, 0.26) under certain conditions (Gradstein 1986; Shih and Huang 1992). Thus, the maximum possible value for r in each correlation involving a dichotomy, obtained from Gradstein (1986), are provided for the reader at the bottom of Table 2 as an aid to interpretation (Gradstein 1986: 260).[11]

OUTLIERS. An important issue in descriptive analyses is that of outliers, or extreme values. In the present analysis, there was one village in 1994 that was an extreme outlier on

[11] For those interested, the maximal value of the point biserial correlation, as shown by Gradstein {{14 Gradstein, Mark 1986/a}} depends on the empirical probability of success, *p*, which can be found for the three dichotomous variables used here in Table 3 as the mean. The values reported at the bottom of Table 4 are taken from the table on page 260 of the article by Gradstein.

measures of rice network structure at both the household and village level. Numerically, on the measure of rice harvest network degree, this value for this village was 10 times the inter-quartile range above the third quartile. Other rice network variables showed similar results for this village. All other villages were within distributional expectation. There is nothing which would bar a village from having a network structure such as this in principle. But neither would it be difficult to obtain such data in error through one of many mistakes in data collection, be it mistranslation, incorrect instructions provided to the respondents in that village, improper recording, or other errors in the data management process. The fact that measures for the same village were not extreme in 2000 further suggests that something was indeed out of the ordinary in this village in 1994. Verifying the reason for the unusual rice network measures is difficult. Population mobility and mortality have acted on the population for over 15 years, while the passage of time has continually eroded respondents' ability to recall. Thus, in light of the degree to which the measured behavior of the village is so far outside the expected range of behavior established by 50 other villages at two points in time, I have removed it from the 1994 village-level analyses.

RESULTS

Reviewing the hypotheses laid out in Section II, I expect to find evidence of the following five relationships in the household and village-level analyses:

> *HYPOTHESIS 1*: A positive relationship between measures of the density, connectivity, and centralization of networks (measures of the level of association and potential information transfer) and reliance on non-monetized forms of exchange at both the household and village levels,

HYPOTHESIS 2: a relationship should only be observable between monetization and characteristics of those specific types of network that are reasonably capable of providing information relevant to the type of transaction under consideration: the predicted relationships should be apparent for the rice network but not for the sibling network.

HYPOTHESIS 3: In monetized exchange, information asymmetry will be detectable as a difference in the strength of relationships for out-ties (labor using) and in-ties (labor providing), while in non-monetized exchange, no such difference will be detectable,

HYPOTHESIS 4: households using both monetized and non-monetized labor will more resemble households who use only non-monetized labor in their network positions, and,

HYPOTHESIS 5: The less well-known a potential source of labor is to a household, the more likely it is that a transaction between the two parties will be monetized.

Village Level Descriptive Results

Table 1 presents descriptive statistics for the village-level measures of network properties and rice-harvest labor strategies. Recall that measures for 1994 and 2000 are identically constructed, here and throughout. Looking first at the village-level measure of monetization, an increase from 83 to 89 percent of households using any paid labor is observed from 1994 to 2000. This increase is not great when compared with the standard deviation, nor is the observed decline in the proportion of households using any free or exchange labor from 20 percent to 15 percent. Most other village-level characteristics also differ between the two periods. All of the variables describing the rice harvest network, except the measure of network centralization experience a near-doubling from 1994 to 2000, reflecting an expansion in the size and the extent of connectivity in the networks. Households were more interconnected via their rice harvest labor ties in 2000 than in 1994, which could be meaningful or reflect nothing more than a

response to the greater quantities of rice harvested in 2000 resulting from plentiful and well-timed rains. Increases were also observed in the same measures for the sibling network, which are not explainable by rainfall. The average degree, number reachable, path length and density of the village sibling network all increased, though more moderately, while the centralization of the village sibling networks remained static. Taken together, these statistics confirm that 1994 and 2000 represent different social contexts, providing a stronger test of the robustness of observed relationships.

Village Level Correlation Results

At the village level, I find the proportion of laborers that was paid and the proportion that was compensated non-monetarily are not randomly distributed across villages with respect to network characteristics. Rather, those villages with a higher average number of ties between households in the rice harvest network, better interconnected networks, and denser networks are also the villages with a higher tendency toward using non-monetized labor. A negative association exists between the proportion of households paying any laborers and the average degree of the rice harvest network (the average number of households helping an ego household) in both 1994 and 2000. In 1994, a statistically significant correlation of -0.44 is found between these variables. A significant correlation of equal magnitude but opposite direction (0.43) is found between the proportion of households using any free labor and the average degree. The corresponding correlation coefficients for 2000 are -0.41 for paid labor and 0.50 for free labor. Each of these indicates a strong, consistent association between the degree of monetization at the village level and the structure of the village rice network. An equivalent and only slightly weaker relationship exists between the average number reachable via any length of path in the village, a measure of connectivity, and both monetization measures. The correlation coefficients for

average number reachable and paid labor are -0.39 in 1994 and -0.24 in 2000 (the latter was marginally significant, at p=0.09, but in a consistent direction); the same coefficients for free labor are 0.37 and 0.32. Lastly, yet again the same exact pattern is apparent in the correlation coefficients measuring the relationship between the density of the village network and both types of exchange in both years (with all but the 2000 paid labor coefficient significant at p<=0.05, and this marginal at p=0.08).

In substantive terms, this finding supports hypothesis 1, that non-monetized labor would be more likely in networks that provided more opportunity for the transmission of various forms of information about potential exchange partners, and correspondingly that paid labor would be more likely in networks that permit lower levels of information flow. Further, the relationship is consistent in both years despite differences in the overall amount of rice grown, the timing of the harvest, the size of the total labor force, the demand for labor, and other factors.

None of the village-level sibling network measures were correlated with either variable in either year. In substantive terms, villages with dense, interconnected webs of sibling affiliation were no more or less likely to be monetized than sparser networks. This finding can be interpreted as support for the second hypothesis, that the type of information that is most useful to decisions about labor exchange is network-specific. While the overall level of interconnectedness in a village cannot be ruled out as a factor that is related to such issues as trust and form of exchange, these results support the theory that general webs of affiliation at the village level do not provide the transaction-specific types of information required to meet the *caveat mutator* burden. This information does appear to be available through networks specific to rice harvesting.

Household Level Descriptive Results

Basic descriptive statistics for household level measures are reported in Table 3. Most of the means of these variables are consistent from 1994 to 2000. Among those that changed between the two periods are the dichotomous measures of whether a household used all paid labor or all non-monetized labor, which showed results very similar to those for the village-level monetization measures. Also, the changes in the nature of the sibling network that were observable at the village level are also apparent and of considerable magnitude at the household level. In contrast, the rice harvest network measures are essentially stable, surprising given the change at the village level and the observation that the number of households who relied on any extra labor to harvest their rice doubled in 2000 over the 1994 number. Despite this sizable difference, the basic characteristics of the average household's rice network position remained comparatively stable over time.

Household Level Correlation Results

Correlation coefficients and significance levels for the household-level analysis are presented in Table 4. Overall, these coefficients are highly consistent across a six year span during which time many aspects of the social, agricultural, and economic context shifted dramatically. They are also quite consistent with the associations found at the village level. Support is found for all five hypotheses at the household level.

Substantiating Hypothesis 1, all of the measures of household network position examined here showed moderately high positive associations with non-monetized labor, and negative associations with monetized labor. Households with a greater number of connections to others, whether through providing labor, using labor, or a combination of both, show a greater tendency toward non-monetized labor. Those that can reach more households in the village and those that

have longer chains of affiliation (paths) reaching farther from the ego household also show a positive association with using non-monetized labor, and a negative association with monetized labor.

The household-level evidence for Hypothesis 2 seems at first to contradict the findings of the village-level analysis. Here the degree and average pathlength of a household's sibling network ties are weakly, but significantly, related to monetized labor exchange in a negative way. But rather than an outright refutation of Hypothesis 2, this finding suggests a more nuanced understanding than was afforded by the village-level analysis. Chiefly, that the both sibling networks and rice networks may be providing some opportunity for the transmission of transaction-relevant information, but that the relationships represented by the rice harvest labor network are considerably more efficient at doing so. Thus, the type of network *does* matter in a way consistent with the assertion that transaction-specific information is provided by specific types of networks, even while both types of networks provide some information.

Support for Hypothesis 3 is the most mixed of the five hypotheses, and suggests at least one refinement of the theory put forth that warrants further examination. The prediction of this hypothesis is that the discrepancy *between* out-ties and in-ties should be *greater* for monetized transactions than for non-monetized transactions. This follows from the prediction that labor users in non-monetized exchange (represented in these data by the in-ties) would have informational requirements similar to those of labor providers, while these requirements should be observably different in monetized exchange. In both 1994 and 2000, a stronger relationship is observed between both forms of exchange and the number of out-ties than is the case for in-ties, which seems to go against the strict prediction of "equal information requirements" for labor users and providers in non-monetized exchange. But this was not the most important prediction

of hypothesis 3. The prediction that the difference would be *greater* for monetized exchange is supported, especially for the year 2000, in which the gap between these two coefficients is nearly twice as large for monetized transactions. The interpretation is that being better connected through *providing* labor to others makes one less likely to use paid labor, but being better connected through *obtaining* labor from others makes one *especially* less likely to use paid labor. And, importantly, this difference is more pronounced for monetized labor than for non-monetized labor. The implication is that while Hypothesis 3 is supported, the conclusion should be re-stated to reflect the fact that information asymmetry appears to exist in non-monetized exchange as well. Missing, for one, is information about the question of who "antes up" first that was discussed earlier. Such additional information might enable more light to be shed on this particular aspect of the relationship between social networks and exchange.

Regarding Hypothesis 4, I find that at the household level the mixing of strategies (using both in-kind labor exchange and money) is a fairly rare practice (see Table 3). A simple interpretation is that a household paying some workers in cash and exchanging labor with others might engender resentment or jealousy on the part of the non-monetized exchange partners. As I have argued, these non-monetized exchange partners stand to benefit from monetizing the exchange by reducing the risk involved in providing labor on an exchange basis. I also find that these mixing households are generally intermediate between the two other groups with respect to the strength and direction of association with rice network variables, which is exactly what one would anticipate. And, as expected, these mixing households are somewhat more similar to their non-monetized counterparts than to the fully monetized households, providing support for the theory that using even a little non-monetized labor obligates a household to invest a substantial amount of effort into meeting the *caveat mutator* burden.

Lastly, I return to the top of Tables 4A and 4B which have been overlooked up to this point. Here I present the correlation matrices between the measures of labor monetization and three identically constructed measures of the source of the labor used: whether all labor was from within the same village, from both within and beyond the village, or entirely from beyond. Examining these correlations provides very consistent results that suggest a relationship between social distance and monetization, supporting Hypothesis 5. When labor is from beyond the village, it is more likely to be monetized and when labor is from within the village it is more likely to be non-monetized. Further, households that mixed exchange strategies were also more likely to mix labor from within and beyond the village.

DISCUSSION

Potential Threats to Internal and External Validity

SAMPLE SELECTION. As noted in Section III, the sample comprises only those households that both grew rice and used extra labor. On a practical level, households that did not acquire any additional labor are isolates in the rice harvest network, giving them values of zero for all household-level network measures; simultaneously, they will all have a value of zero for any measure of monetization (that is, they did not pay any workers nor did they use any exchange labor). Thus, including them in simple correlation analyses has the effect of adding a large number of observations with values of (0,0) for each pair of variables. This unduly and inaccurately biases the resulting measures of association, easily turning negative correlations positive and giving all correlations an artificially high level of significance. As well, it conflates "real" zeros – those households that used extra labor but did not pay any laborers, for example – with "structural" zeros – those households that could not pay any laborers because they did not grow rice and hence had not need for rice harvest labor at all.

More formally, it could be argued that all rice-growing households are *at risk* of acquiring this additional labor and thus the larger sample that includes these households should be used. Excluding those households for which the outcome of interest was not observed has the potential to influence more than just the external validity of the results. Internal validity can also be affected when sample selection is present (Berk 1983). Likewise, those households that grew rice may be a select (non-random) sample of all households in Nang Rong. Therefore, there is a risk that the observed relationships might differ if those households that did not grow rice and pay extra labor had engaged in these behaviors. Put differently, the actual sample used might differ in ways that impact the relationships between variables observed. On the other hand, if the selection process does not influence the specific relationships observed here, then it can be effectively ignored within the context of the present analysis.

I address these concerns in three specific ways. First, I have dealt extensively with the nature of sample selection in the Nang Rong labor exchange data in previous work, which specifically describes the factors influencing the household decision to grow rice and pay laborers (Hull 2009c). Based upon that analysis, the households that did not grow rice at all were, on average, smaller, older, and considerably less likely to own or use any agricultural land, livestock, or agricultural equipment. The stability observed in these observations over time, paired with the comparatively small fraction of households that did not grow rice in either year suggest that while theoretically possible, the counterfactual has little meaning in this specific instance. That is, many of the households that did not grow rice would not have done so under any plausible set of circumstances. Moreover, as I also argued in that paper, the decision to grow rice appears to be less related to subsequent decisions about labor than previously thought, which supports the assertion that any correlation between unobserved selection factors and the observed

relationships between social network factors and labor monetization may be minimal. For these reasons, I choose to focus for the remainder of this discussion on the potential effect of selection into using extra labor, and not selection into growing rice.

The second observation helps to address concerns about this latter selection process. Specifically, it is relevant that the relationships are nearly identical in both significance and magnitude in both 1994 and 2000. This is despite the considerable shifts in the proportion of the total population and the proportion of rice-growing households that used extra labor, as shown in Table 5. Both the raw number and the proportion of rice-growing households that used any extra labor nearly doubled, in the case of proportions from 34 percent in 1994 to 64 percent in 2000. And yet, despite the considerable shifts in these proportions, the observed relationships were extremely stable over the same period. This is additional evidence that any forces at work in shaping the selection into using extra labor may not impact the observed relationships.

Third, there is the consideration that current methodological approaches for dealing with the potential effects of selection are almost exclusively designed for advanced causal modeling. It has been an explicit element of the present analysis that no statements be made about the direction of possible causality. As stated in a previous section, there are valid theoretical arguments suggesting that monetization may reshape social networks, and that networks may influence monetization. Thus, any attempt to deal formally with the selection effect, such as the use of a two-part model, Heckman model, or related instrumental variable approach must also deal effectively with a highly probable endogenous relationship. To the best of the author's knowledge, the Nang Rong Project data are already extremely rare by virtue of the fact that they collect information on both social networks and labor exchange compensation. As noted in my

previous work cited above, no viable candidate variables exist to be used as an instrument to deal with either of these two fundamental problems of multivariate modeling.

In sum, there are a number of reasons, both theoretical and methodological, for limiting the analysis to only those households that acquired additional labor beyond their current, returning, and former members. Any impact of selection on the observed results, while difficult to estimate in practice, is thought to be modest. Subsequent data collection efforts may enable this question to be still better addressed.

TYPE II ERRORS DUE TO MULTIPLE COMPARISONS. A second potential critique of the exploratory and descriptive analysis presented here is that a large number of hypothesis tests are carried out without consideration for the possible effects of multiple testing. Concerns about multiple testing in the present instance seem unwarranted for reasons to be discussed below, but as a check against this threat to inference, a Bonferroni-style multiple comparison procedure can be employed to assess the robustness of the results to such a criticism. While many variations on the basic Bonferroni correction exist, these are universally motivated by a concern for to improving statistical power, not providing a better check against the risk of Type I error. The simple Bonferroni correction is already maximally conservative in this latter regard (Holm 1979; Olejnik et al. 1997).

Thus, in the context of sensitivity analysis the Bonferroni is ideal, as it is both simple and conservative.[12] Applying the correction is straightforward, with one exception being the determination of the relevant family of comparisons. Again, wishing to err on the side of conservatism, I define the family of hypotheses for this multiple comparison procedure as all tests performed at a given level of analysis on data from a given year. There are thus four

[12] The specific correction used is the substitution of α/m in place of α, where α is the level of significance and m is the total number of relevant tests contained in the family of comparison.

families: household and village level tests in 1994 and household and village tests in 2000. The Bonferroni-adjusted significance levels for the household-level analysis would be p<=0.0013 (for 39 hypothesis tests). The Bonferroni-adjusted significance levels for the village-level analysis would be p<=0.005 (for 10 hypothesis tests). Each of these adjusted levels controls for the family-wise type I error rate at the conventional level of p<=0.05. The summary conclusion is that the application of the Bonferroni adjustment does not alter the general conclusion that all five hypotheses receive support. However, some minor differences do emerge.

When this standard is applied to the village level analysis, 4 of the 10 coefficients that were initially judged to be significant retain that significance, but the change is quite systematic. The relationship between the average degree of the rice network and the proportion of both monetized and non-monetized transactions remains significant in both years, while the relationships with the density and connectedness measures are no longer significant. Recall, however that the hypotheses were not framed at the level of specific variables but were more general, stating that a difference should exist on at least some of the measures. Thus, at the village level, evidence of a relationship is weakened, but is still sufficient to support the major conclusions at this level even with this highly conservative correction.

When the Bonferroni adjustment is performed on the household-level significance tests, 45 of the 62 coefficients that were significant initially retain significance under this more conservative application. And as before, the pattern of change is systematic. It is almost exclusively the sibling network variables that cease to demonstrate a statistically significant relationship with the measures of monetization. Owing to the substantially weaker relationships detected with these sibling network measures, they do not meet the higher standard of the Bonferroni-adjusted significance level, but the rice network measures continue to do so. Only

Hypothesis 2 depended directly on the distinction between sibling and rice harvest networks, and when these coefficients drop out of the pool of interpretable findings, the essential conclusion that rice networks best conduct information relevant to decisions about rice harvest labor exchange is not affected. The other hypotheses were evaluable based solely on the associations between the rice network measures and the monetization measures. Likewise, Hypothesis 5, which is based upon the correlation matrices at the top of Tables 4A and 4B remains unaffected by this adjustment.[13]

The approach used here to control the rate of Type I errors, the single-step Bonferroni correction, also has the potential to increase the risk of Type II errors. In the context of an attempt to identify previously unnoticed correlations between variables typically studied in isolation from one another, the question of which type of error poses the greater threat to scientific progress is largely a matter of opinion. As Westfall and Young remind us, the meaningfulness of any set of findings must be judged according to costs and benefits, introducing a dimension of art to the science of interpretation (1993). So judged, the chief aim of the present research is the generation of empirically substantiated hypotheses about a newly derived set of theoretical associations. All of these will require further confirmation regardless, and other elements of a causal interpretation such as directionality and a lack of spuriousness remain to be fully established. Therefore, judged by either standard of significance, the principal

[13] I present these additional results in answer to the possible criticism that the significance of the findings that support the conclusions of this analysis might result from chance alone, which it appears they do not. However, it is also worth noting that the application of multiple comparison tests to the correlation context is not a firmly established practice. The best evidence of this is that in a comprehensive review of more than two dozen methodology articles published in the past 30 years that introduce a procedure for controlling either the expected number of Type-I errors, the familywise error rate, or the false discovery rate, a single article by Collis and Rosenblood (Collis and Rosenblood 1985) was the only article found to suggest a correction method especially for correlation matrices. As further evidence of the confusion that seems to persist, standard software packages do not readily offer any form of correction for the large number of hypothesis tests conducted during a correlation analysis. Conversely, general procedures that carry out multiple comparison tests such as SAS's PROC MULTTEST do not permit the researcher to conduct these adjusted test of significance on correlation coefficients. It is possible to implement such procedures using original code, but a cursory review of correlation tables presented in the literature suggests that this is rarely done in practice.

findings remain, but it is the author's opinion that in this instance the multiple comparison procedure represents a strong dose of medicine for a very mild problem that only serves to dampen the pace of exploration of this new area of study. Type I errors, if they exist at all, will not long stand up to the heavy replication that research at this stage of development merits.

Competing Explanation of Findings

A third general critique that might be directed at the empirical results presented here is that they can be explained by reference to a simpler theory. Thus, in the absence of any additional support for the more sophisticated theory, parsimony would argue that this simpler explanation be accepted. The simple theory can be stated as a rule: if sufficient labor is available from within the village, then non-monetized exchange will be used, but if this labor source is exhausted, then strangers must be called in from outside the village, and these exchanges will be monetized as a matter of course.

Several things should be said about this alternative explanation. First, of the five specific hypotheses derived and empirically demonstrated in this paper, only hypothesis 5 deals directly with the inside/outside distinction. And as was noted earlier, the dichotomy of labor from within the village and labor from beyond is not without its problems. As a proxy for the underlying concepts of familiarity or trust, this dichotomy is crude at best. And yet, despite the lack of sophistication in the way the variable was measured, it is possible to adjudicate between these two competing theories.

Before doing so, a second observation is warranted. Namely, that properly considered, this "alternative" explanation is not an alternative to the theory presented in Section II. Rather, it arises due to the inefficiency of the current analytical strategy for demonstrating this theory. If the alternative were found to indeed explain all of the results presented here, it would not, *ipso*

facto, mean the falsification of the theory presented here. Rather, it would signal a need for further data collection and analysis because the theory presented here provides additional interpretive power that the alternative does not. That is, the new theory makes a number of additional statements about the nature of monetized exchange that could not be directly verified using existing data but that were nonetheless described in Section II. The alternative model explains the findings in terms of labor supply and a simple rule: use non-monetized village labor first, and then use monetized extra-village labor. But this alternative does not explain the underlying motivations for such preferences, which is precisely the additional matter that the new theory speaks to. Beyond the five hypotheses presented here, it suggests both who should prefer monetized labor, and *why*, making its explanatory power greater, but also making it more difficult to support empirically.

A third observation raises still more doubts about the adequacy of this alternative. While it is true that the alternative satisfactorily explains the observed correlation between the source of labor and the type of exchange, it simultaneously implies 1.) that paid outside labor ought to be used most in those villages with the greatest unmet labor demand and 2.) that most fellow villagers should not be paid for their labor. A quick descriptive analysis suggests that neither of these corollaries is consistently true. Measuring unmet labor demand is complicated, but as a rough measure, the ratio of the total area of land planted to rice to working age adults in a village suffices to show that the predicted relationship is not consistent either across or within years. Table 6 reports the correlations between this ratio and for different measures of monetization at the village level. The first three are the number of households using any paid labor divided by each of the three possible denominators listed in Table 5 – all households, rice-growing households, and extra-labor using households. The fourth is the proportion of all *rice labor* that

was monetized. From this analysis it appears that, in general, unmet labor demand within the villages was potentially greater in 2000 than in 1994, consistent with what is known about growing conditions in both years. And there is indeed, a statistically significant relationship between three of the measures of monetization and the ratio of land to labor. But, equally clear from the table is the fact that such a relationship was not significant for these same variables in 1994. The implication, that unmet labor demand had little relationship to monetized labor in 1994 suggests that an alternative explanation is required in this year to explain the main findings of the paper, which were observed in both 1994 and 2000.[14]

The same process of deduction is used to show that the second corollary is not supported by the data. In 1994, around 70 percent of the within-village labor provided to households was monetized, while by 2000 this figure had grown to over 90 percent. When the use of monetized labor within the village is assessed on a household-by-household basis, the proportions fall, but not nearly enough to support the alternative in its simplest formulation. Simply put, so many villagers are paid (and indeed a large enough share of laborers from outside the village works for free or exchange) that the simple rule posited above cannot be valid. If the rule is refined to suggest that all *well known* villagers provide non-monetized labor first, and subsequently strangers provide paid labor, the alternative becomes scarcely different from the theory presented here, except that it continues to lack a satisfying explanation for *why* such a preference should exist. To summarize, an explanation that relies solely on preferences and unmet labor demand in the village superficially fits the pattern of the data, but fails to win support both because its necessary corollaries are not borne out by the data and because it still fails to provide any deeper

[14] No reliable relationship at all was found to exist between identical measures of the proportions using help from beyond the village correlated with the same rough measure of unmet labor demand at the village level.

explanation for the preferences themselves. [15] While more complex, the theory advanced here explains the consistent pattern observed in these two very different observational periods in a way that the competing theory cannot, and displays more finesse when making valid predictions (five were presented here) than the next best alternative.

Conclusions

In this paper I present a theory of monetization that introduces the concept of the *caveat mutator* burden, the minimum amount of information an actor must obtain about a potential exchange partner before feeling confident enough to carry out a transaction. This burden is thought to vary with the actors involved, the context of the exchange, and the types of valued objects or services exchanged. Moreover, and central to the thesis presented here, the *caveat mutator* burden is radically altered in subtle but important ways by the introduction of monetary instruments into the context of exchange. In monetary exchange, a portion of the trust that is required for the actor to feel confident in carrying out the exchange is invested in a social institution that guarantees the value of the money received or given rather than the exchange partner, and thus, is more likely to encourage such transactions in many conditions. And yet, it is shown here that contrary to the informal statements and implicit models of monetization in the literature, monetization is not the juggernaut it is made out to be. Some households in Nang Rong pay their laborers, some do not. Presuming that few non-household members ever truly work for free, the conclusion is that some households continue to have valid reasons for

[15] As yet another test of the alternative hypothesis, I divided the sample in half according to household labor supply and total rice yield. I then recalculated the correlations from the main analysis for each of the four subgroups produced – low labor, low yield, low labor, high yield, high labor, low yield, and high labor, high yield. This same process was repeated excluding former household members, using total extra labor used by the household and total rice yield, total labor used in the village by total village rice land cultivated, and an alternative specification of the village measures. In none of these specification tests were the findings of the principle analysis contradicted. Even in the cells with the greatest imbalances in the amount of available labor relative to labor demand a relationship was consistently observed between the proportion of households using monetized labor and the proportion of extra-village help. This further elaboration is further proof that, at the household level, hypothesized unmet labor demand does not condition any of the observed relationships among variables.

engaging in non-monetized transactions. There is every reason to assert that despite its being a traditionally subsistence region, every household in Nang Rong is familiar with money and uses it in at least some cases, if only for the payment of taxes to the central government (Rigg 1994). Whether those households that use non-monetized exchange do so because it provides benefits of some sort or because they have no alternative (due to a lack of available cash, for instance) is an important question and one that should be investigated further. But even the basic conclusion that in the year 2000 a full 15 percent of Nang Rong households still used at least some unpaid labor calls for a theoretical treatment of monetization in the future that better acknowledges the complexity and subtlety inherent in the phenomenon, rather than a continuation of the practice of painting monetization in broad strokes.

Establishing correlation or association is a vital element in causal analysis, and therefore the significant correlations demonstrated here represent an important contribution to the study of the relationship between social networks and monetization. Moreover, the theory presented in this paper provides reasonable grounds to anticipate that the relationships observed are due to more than pure chance or spuriousness. The empirical associations found are entirely consistent with the theory developed and described in this paper. I find that households in Nang Rong, Thailand, a district in Northeast Thailand that is known for both its poverty and its unique social adaptations to an unyielding landscape, tend to utilize monetized and non-monetized labor in ways that are entirely consistent with expectations deduced from theory. These households display a tendency to continue using non-monetized labor in situations where the exchange partner is better known. The assertion that trust, or familiarity, factors into the evaluation of a potential trade partner is among the most important theoretical statements made here, and deserves more rigorous evaluation, as does the argument that an informational asymmetry exists

in monetized transactions that is not present to nearly the same degree in non-monetized transactions. Lastly, it would seem that these households may use information acquired through rice harvest networks, but not through sibling networks, despite the fact that sibling networks have been shown to be viable conduits for other forms of information.

Monetization matters in all kinds of ways, so the literature asserts. But if sociologists are to move beyond the practice of attributing to monetization a causal role without any real empirical evidence to support that claim, a dedicated program of research that bridges sociology, economics, anthropology, and related fields will be necessary. In this paper, I have attempted to bring together a broad scattering of relevant theoretical and methodological concerns and use them to generate some initial hypotheses about monetization using the example of rice labor in Northeast Thailand. The list of possible economic transactions, social contexts, and even historical eras that could generate data capable of shedding additional light on this subject may be long, but it awaits researchers who will collect these data, or recognize the opportunity to conduct a secondary analysis of data collected for a different initial purpose. The analysis presented here is simple enough that, should such additional secondary resources be found, suitable comparative research and even replication will be possible.

TABLE 3.1 Descriptive Statistics for All Village-Level Measures, 1994 & 2000

1994 (n=50) (a)

Variable Description	N	Mean	SD	Min	Max
Proportion Extra Labor Households with Any Labor Paid	50	0.83	0.11	0.61	1
Proportion Extra Labor Households with Any Labor Free/Exchang	50	0.2	0.12	0	0.46
Rice Network Degree: Mean (b)	50	0.94	0.64	0.02	3.25
Rice Network # Reachable: Village Mean	50	0.24	0.18	0.01	0.78
Rice Network Pathlength: Village Mean	50	0.9	1.51	0.01	9.5
Rice Network Density: Mean	50	0	0	0	0.01
Rice Network Centralization: Mean	50	0.03	0.02	0.01	0.11
Sibling Network Degree: Mean	50	1.26	0.6	0.37	2.7
Sibling Network # Reachable: Village Mean	50	0.12	0.09	0.01	0.49
Sibling Network Pathlength: Village Mean	50	0.46	0.56	0.01	3.25
Sibling Network Density: Mean	50	0.01	0	0	0.01
Sibling Network Centralization: Mean	50	0.02	0.01	0.01	0.04

(a) One highly influential outlier removed from all village-level analyses.
(b) All network measures calculated using symmetric intra-village ties, excludes self-reflexive ties.

2000 (n=51)

Variable	N	Mean	SD	Min	Max
Proportion Extra Labor Households with Any Labor Paid	51	0.89	0.08	0.64	1
Proportion Extra Labor Households with Any Labor Free/Exchang	51	0.15	0.11	0.01	0.48
Rice Network Degree: Mean (b)	51	1.59	0.65	0.58	3.13
Rice Network # Reachable: Village Mean	51	0.48	0.21	0.14	0.99
Rice Network Pathlength: Village Mean	51	1.64	1.4	0.37	6.98
Rice Network Density: Mean	51	0.01	0	0	0.01
Rice Network Centralization: Mean	51	0.02	0.01	0.01	0.05
Sibling Network Degree: Mean	51	1.83	0.58	0.93	3.36
Sibling Network # Reachable: Village Mean	51	0.43	0.31	0.1	1.92
Sibling Network Pathlength: Village Mean	51	2.65	3.87	0.23	22.9
Sibling Network Density: Mean	51	0.01	0	0	0.01
Sibling Network Centralization: Mean	51	0.02	0.01	0.01	0.06

(a) All network measures calculated using symmetric intra-village ties, excludes self-reflexive ties.

TABLE 3.2 Pearson Correlations among Village Characteristics and Rice Harvest Labor Measures, 1994 (r and p-values) (a)

1994 (n=50) (b)

	Variable Description	Proportion of Labor-Using Households Using Any Paid Labor	Proportion of Labor-Using Households Using Any Free/Exchange Labor
8	Rice Network Degree: Village Mean (c)	**-0.44**	**0.43**
		0.00	**0.00**
9	Rice Network # Reachable: Village Mean	**-0.39**	**0.37**
		0.01	**0.01**
10	Rice Network Pathlength: Village Mean	-0.30	0.26
		0.04	0.07
11	Rice Network Density: Village Mean	**-0.32**	**0.30**
		0.02	**0.04**
12	Rice Network Degree Centralization	-0.11	0.11
		0.43	0.46
13	Sibling Network Degree: Mean	0.07	-0.07
		0.65	0.62
14	Sibling Network # Reachable: Village Mean	-0.10	0.09
		0.49	0.55
15	Sibling Network Pathlength: Village Mean	-0.02	0.00
		0.88	0.98
16	Sibling Network Density: Mean	0.12	-0.14
		0.40	0.33
17	Sibling Network Centralization: Mean	-0.09	0.07
		0.55	0.61

(a) Correlation Coefficients significant at the p<= 0.05 level are emphasized in BOLD.

(b) One highly influential outlier removed from all village-level analyses.

(c) All network measures calculated using symmetric intra-village ties, excludes self-reflexive ties.

TABLE 3.3 Pearson Correlations among Village Characteristics and Rice Harvest Labor Measures, 2000 (r and p-values) (a)

	2000 (n=51) Variable Description	Proportion of Labor-Using Households Using Any Paid Labor	Proportion of Labor-Using Households Using Any Free/Exchange Labor
8	Rice Network Degree: Village Mean (b)	**-0.41**	**0.50**
		0.00	**0.00**
9	Rice Network # Reachable: Village Mean	-0.24	**0.32**
		0.09	**0.02**
10	Rice Network Pathlength: Village Mean	-0.11	0.21
		0.46	0.14
11	Rice Network Density: Village Mean	-0.25	**0.34**
		0.08	**0.02**
12	Rice Network Degree Centralization	-0.05	0.15
		0.74	0.29
13	Sibling Network Degree: Mean	-0.07	0.05
		0.61	0.74
14	Sibling Network # Reachable: Village Mean	-0.05	0.05
		0.71	0.74
15	Sibling Network Pathlength: Village Mean	-0.06	0.02
		0.69	0.86
16	Sibling Network Density: Mean	0.09	-0.10
		0.55	0.50
17	Sibling Network Centralization: Mean	0.13	-0.11
		0.37	0.45

(a) Correlation Coefficients significant at the p<= 0.05 level are emphasized in BOLD.

(b) All network measures calculated using symmetric intra-village ties, excludes self-reflexive ties.

TABLE 3.4: Descriptive Statistics for Household-Level Measures, 1994 & 2000

1994 (n=2007)

Variable	N	Mean	SD	Min	Max
Household Used Extra Labor: Free/Exchange Only	2007	0.185	0.389	0	1
Household Used Extra Labor: Free/Exchange and Paid	2007	0.033	0.18	0	1
Household Used Extra Labor: Paid Only	2007	0.781	0.413	0	1
Household Used Extra Labor: Within Village Only	2007	0.606	0.489	0	1
Household Used Extra Labor: Within and Beyond Village	2007	0.098	0.297	0	1
Household Used Extra Labor: Beyond Village Only	2007	0.296	0.457	0	1
Rice Network: Degree (a)	2007	2.349	2.422	0	14
Rice Network: Out-Degree	2007	1.647	1.753	0	8
Rice Network: In-Degree	2007	0.702	1.354	0	9
Rice Network: Number Households Reachable by Pathlength=Any	2007	3.713	9.358	0	113
Rice Network: Average Pathlength, (Infinite Pathlengths=0)	2007	0.912	0.857	0	6.067
Sibling Network: Degree	2007	1.625	2.278	0	15
Sibling Network: Out-Degree	2007	0.821	1.588	0	9
Sibling Network: In-Degree	2007	0.804	1.209	0	8
Sibling Network: Number Households Reachable by Pathlength=An	2007	1.859	5.435	0	85
Sibling Network: Average Pathlength, (Infinite Pathlengths=0)	2007	0.457	0.846	0	6.9

(a) All network measures calculated using symmetric intra-village ties, excludes self-reflexive ties.

2000 (n=4081)

Variable	N	Mean	SD	Min	Max
Household Used Extra Labor: Free/Exchange Only	4081	0.113	0.317	0	1
Household Used Extra Labor: Free/Exchange and Paid	4081	0.045	0.206	0	1
Household Used Extra Labor: Paid Only	4081	0.842	0.365	0	1
Household Used Extra Labor: Within Village Only	4081	0.613	0.487	0	1
Household Used Extra Labor: Within and Beyond Village	4081	0.147	0.354	0	1
Household Used Extra Labor: Beyond Village Only	4081	0.24	0.427	0	1
Rice Network: Degree (a)	4081	2.538	2.33	0	16
Rice Network: Out-Degree	4081	1.736	1.648	0	9
Rice Network: In-Degree	4081	0.802	1.324	0	9
Rice Network: Number Households Reachable by Pathlength=Any	4081	3.494	5.715	0	49
Rice Network: Average Pathlength, (Infinite Pathlengths=0)	4081	1.032	0.864	0	5.792
Sibling Network: Degree	4081	2.794	3.038	0	17
Sibling Network: Out-Degree	4081	1.383	1.941	0	9
Sibling Network: In-Degree	4081	1.411	1.586	0	9
Sibling Network: Number Households Reachable by Pathlength=An	4081	6.538	15.9	0	134
Sibling Network: Average Pathlength, (Infinite Pathlengths=0)	4081	0.98	1.458	0	10.65

(a) All network measures calculated using symmetric intra-village ties, excludes self-reflexive ties.

TABLE 3.5: Pearson Correlations Between Household-Level Network and Rice Harvest Labor Measures, 1994 (r and p-values) (a)

1994 (n=2007)

Variable Description	Household Used Extra Labo Free/Exchange Only	Household Used Extra Labo Free/Exchange and Paid Labo	Household Used Extra Labo Paid Only
Household Used Extra Labor: Within Village Only	**0.15**	**-0.07**	**-0.12**
	<.0001	**0.00**	**<.0001**
Household Used Extra Labor: Within and Beyond Village	**-0.04**	**0.27**	**-0.08**
	0.07	**<.0001**	**0.00**
Household Used Extra Labor: Beyond Village Only	**-0.14**	**-0.10**	**0.17**
	<.0001	**<.0001**	**<.0001**
Rice Network: Degree (b)	**0.30**	**0.10**	**-0.33**
	<.0001	**<.0001**	**<.0001**
Rice Network: Out-Degree	**0.31**	**0.11**	**-0.34**
	<.0001	**<.0001**	**<.0001**
Rice Network: In-Degree	**0.15**	0.03	**-0.15**
	<.0001	0.14	**<.0001**
Rice Network: Number Households Reachable by Pathlength=Any	**0.09**	**0.08**	**-0.12**
	<.0001	**0.00**	**<.0001**
Rice Network: Average Pathlength, (Infinite Pathlengths=0)	**0.12**	**0.10**	**-0.15**
	<.0001	**<.0001**	**<.0001**
Sibling Network: Degree	**0.05**	0.01	**-0.05**
	0.03	0.82	**0.04**
Sibling Network: Out-Degree	**0.05**	0.01	**-0.05**
	0.02	0.53	**0.02**
Sibling Network: In-Degree	0.02	-0.01	-0.02
	0.30	0.69	0.42
Sibling Network: Number Households Reachable by Pathlength=Any	0.02	0.01	-0.02
	0.38	0.79	0.35
Sibling Network: Average Pathlength, (Infinite Pathlengths=0)	**0.05**	0.02	**-0.05**
	0.04	0.48	**0.03**
Maximum Value of Point Biserial Correlation Coefficient	0.69	0.40	0.72

(a) Correlation Coefficients significant at the p<= 0.05 level are emphasized in BOLD.

(b) All network measures calculated using symmetric intra-village ties, excludes self-reflexive tie

TABLE 3.6: Pearson Correlations Between Household-Level Network and Rice Harvest Labor Measures, 2000 (r and p-values) (a)

2000 (n=4081)

Variable Description	Household Used Extra Labo Free/Exchange Only	Household Used Extra Labo Free/Exchange and Paid Lab	Household Used Extra Labo Paid Only
Household Used Extra Labor: Within Village Only	**0.11**	-0.03	**-0.08**
	<.0001	0.10	**<.0001**
Household Used Extra Labor: Within and Beyond Village	**-0.06**	**0.17**	**-0.04**
	0.00	**<.0001**	**0.00**
Household Used Extra Labor: Beyond Village Only	**-0.08**	**-0.11**	**0.13**
	<.0001	**<.0001**	**<.0001**
Rice Network: Degree (b)	**0.26**	**0.22**	**-0.35**
	<.0001	**<.0001**	**<.0001**
Rice Network: Out-Degree	**0.24**	**0.25**	**-0.35**
	<.0001	**<.0001**	**<.0001**
Rice Network: In-Degree	**0.16**	**0.08**	**-0.19**
	<.0001	**<.0001**	**<.0001**
Rice Network: Number Households Reachable by Pathlength=Any	0.02	**0.13**	**-0.09**
	0.20	**<.0001**	**<.0001**
Rice Network: Average Pathlength, (Infinite Pathlengths=0)	**0.09**	**0.14**	**-0.16**
	<.0001	**<.0001**	**<.0001**
Sibling Network: Degree	0.03	**0.03**	**-0.04**
	0.06	**0.05**	**0.01**
Sibling Network: Out-Degree	0.03	**0.04**	**-0.05**
	0.07	**0.01**	**0.00**
Sibling Network: In-Degree	0.02	0.01	-0.02
	0.17	0.47	0.11
Sibling Network: Number Households Reachable by Pathlength=Any	**0.04**	0.00	**-0.03**
	0.02	0.94	**0.05**
Sibling Network: Average Pathlength, (Infinite Pathlengths=0)	**0.04**	**0.03**	**-0.06**
	0.01	**0.03**	**0.00**
Maximum Value of Point Biserial Correlation Coefficient	0.60	0.44	0.66

(a) Correlation Coefficients significant at the p<= 0.05 level are emphasized in BOLD.

(b) All network measures calculated using symmetric intra-village ties, excludes self-reflexive tie

TABLE 3.7: Proportions of Households at Each Stage of Sample Selection

	1994			2000		
Sample	**Number of Households**	**Percentage of All Households**	**Percentage of Rice Households**	**Number of Households**	**Percentage of All Households**	**Percentage of Rice Households**
All Households	7331	100%		8638	100%	
Rice Growing Households	5835	80%	100%	6389	74%	100%
Extra Labor Using Households	2007	27%	34%	4081	47%	64%

TABLE 3.8: Correlation between Village Labor Demand and Select Measures of Monetization

	1994	2000
Proportion of Extra-Labor Using Households Using Paid Labor	0.15	**0.37**
	0.28	**0.01**
Proportion of Rice Households Using Paid Labor	**0.28**	0.13
	0.04	0.38
Proportion of All Households Using Paid Labor	0.15	**0.52**
	0.31	**<.0001**
Proportion of All Rice Labor Used that was Paid	0.10	**0.32**
	0.50	**0.02**

NOTE: Correlations in BOLD are significant at the p<=0.05 level.

CHAPTER 4

AGRICULTURAL PARTICIPATION AND LABOR MONETIZATION IN A TRANSITIONAL ECONOMY

INTRODUCTION

"Monetization" and "monetized" are popular words among social scientists trying to describe massive social, cultural, and economic forces transforming the populations they study, particularly in developing contexts. The terms have appeared in nearly one hundred demography articles in the past three decades in discussions about many core subjects of the discipline (Hull 2009a). Demographic subjects that have been implicitly linked to monetization in the literature include fertility, mortality, migration, and many aspects of economic development. In short, it is a literature too voluminous to be reviewed here (but see Appendix A for a brief annotated bibliography). In these articles, it is in characterizing context – the social, economic, and cultural backdrop against which some other phenomenon of interest occurs – that mention of monetization is made. But where found, the term is consistently employed without definition or explanation, and rarely if ever is it developed into a meaningful part of the principal discussion. Monetization is perpetually relegated to discussions of the broader implications and connections of research found in introductory and concluding paragraphs.

In contrast, the present work shifts monetization to the foreground, operationalizing and measuring the concept and specifying its relationship to a wide range of significant social and demographic factors. Without this sort of attention to the specific *way* in which economic

exchange takes place in a given context, not just the scope and extent of such exchange which more commonly captures the attention of researchers, explanations of economic phenomena are incomplete at best. So too are discussions of phenomena that are the cause or consequence of things economic. At the same time, there is an important lesson to be abstracted from the way monetization has been dealt with in the past: namely, that monetization should be explored and understood within a specific context which defines the types and nature of transactions, networks, and institutional structures that impact and are impacted by it. Thus, in this paper, I do just this by exploring correlates of the monetization of a specific type of transaction in a specific context: the acquisition of agricultural labor during the annual rice harvest in Northeastern Thailand.

The question I seek to answer is, in this specific context, which households engage in monetized labor transactions, and which households rely on labor exchange or free labor? In addition to answering the question, this example will be used to illustrate several more general observations about monetization and the methods use to study it. First, a major obstacle to a better theory of monetization in the past has been the tendency to treat the phenomenon as an abstract process of social change with no specific referent. When one asserts that "monetization" impacts, for example, inequality and status roles in a community, some logical questions should be: monetization of what? Of which exchanges? All exchanges? And so on. These subsidiary questions are rarely asked, and as a result, the possibility of understanding monetization as a more general process of social change is hampered. At present, no one is in a position to state (and to support with empirical evidence) whether different economic sectors actually monetize concurrently, that the monetization of X leads to Y, or which actors, if any, embrace monetized exchange and which, if any, avoid it. To address this shortcoming, in this paper I seek to explain

the monetization of a specific type of economic exchange, just one of many. The choice of rice harvest labor as the example is significant, however. The ideal form of exchange to measure and analyze as a starting point in building a better theory of monetization should be one that is widespread in a given context, reasonably bounded in time and space, and only partially or fully monetized. Seasonal agricultural labor fits these requirements quite well.

Second, properly conceptualized, monetization is a specific characteristic of individual economic transactions taking place within a network of exchange. Each individual transaction may be monetized or not, but the larger network of exchanges also takes on a specific character as a result of the aggregate impact of these individual transactions. Elsewhere, I have examined this relationship between social network structure and monetization, demonstrating a number of stable associations between the network context and the nature of the economic exchange (Hull 2009b). Here, I develop a different implication of the same theoretical framework: namely, that to understand the pattern and nature of monetization more generally, it is also necessary to investigate the pattern and nature of the economic activities being monetized. In the example used here, of the monetization of rice harvest labor, this means that it is of considerable utility to understand the factors influencing a household's participation in rice agriculture. For this reason, and for additional methodological reasons explored later, I will examine monetization and agricultural participation simultaneously in order to better understand the phenomenon of monetization itself.

Third, according to the theory laid out below, it is appropriate to examine monetization in a single economic sector or type of transaction, but this is not to say that such behavior exists in a vacuum. Clearly, the monetization of different aspects of life can be thought of as elements of a broader process of social change in which many such aspects become monetized. This seems to

be the predominant, if not the only, view in both popular and theoretical understandings of monetization (Hull 2009a). This view is not criticized here. Instead, the present example presents an important illustration of this point by virtue of the fact that, for a formerly subsistence agricultural household to cease to engage in rice agriculture altogether, that household must meet its basic needs in some other way, which almost certainly involves the use of money. Thus, there is a strong additional reason to examine these two phenomena, agricultural participation and labor monetization, together: labor monetization is theorized to be an outgrowth of a broader process of societal monetization that may be somewhat antagonistic to traditional agriculture.

It is with these broader observations in mind that I aim to answer two questions which have both theoretical and practical significance for regions that use a mixture of monetized and non-monetized exchange. The first question in this analysis is posed with respect to a specific type of economic transaction which is common in the *Isan* region of Northeast Thailand: during the highly labor-intensive wetland rice harvest, which households pay their workers in cash, and which rely on barter-like schemes such as labor exchange? The act of paying workers in cash rather than exchanged labor or barter may seem at first a trivial matter, but from a sociological point of view, it represents a fundamental transition in the economic relationships that exist between the transacting parties. To preview one reason, the cash transaction no longer represents a transaction between just two parties, the laborer and the farmer, but between three: the laborer, the farmer, and the abstract third-party agent or government that determines what units will be used in economic accounting and which insures, formally or informally, the value of any money exchanged (Dodd 1994).

Monetization also signals an underlying process of attaching a monetary value to all things. When accepted as a medium of exchange, money may render barter and other forms of

exchange less desirable, but in order for a household to monetize its transactions, it must first obtain money, which can lead it down additional paths of new behavior – out-migration for wage labor, planting cash crops, or local wage labor where available. Possibilities for obtaining cash are often restricted in these regions, but the creativity of households often far surpasses the imagination of researchers attempting to measure and understand such behavior. In this paper, I propose to explore which of several key behaviors and statuses is related to the act of paying laborers in order to ground discussion of monetization in the empirical experience of those for whom monetization is less taken for granted.

The second question is what characteristics are associated with a household's decision to engage in the primary type of agriculture in a predominantly subsistence economy, in this case rice cultivation? Logically, this second question is inseparable from the first because one cannot pay for labor if none in needed. But as described above, the decline of subsistence agriculture also signals, albeit less directly, the emergence of alternative strategies for earning a livelihood. Northeast Thailand, where the data for this study were collected, is a region in which greater than 80 or 90 percent of all households have historically been engaged in subsistence rice agriculture. In recent decades, evidence suggests that the share of households practicing rice agriculture is on the decline, at least in the study area for this research. As households face an expanding list of economic choices and opportunities, these are continuously weighed against the longstanding challenges of making a living through subsistence agriculture. Therefore, one might expect that some households are abandoning rice agriculture or experimenting with other economic strategies. But which households, and why? Any fundamental shift in the basis of economic livelihoods may be attributable to a wide range of factors operating additively, interactively, or in a mutually reinforcing ways. Life course effects may also play an important role in this process.

Basic population aging and household fragmentation or nucleation may all play a role. A household's decision to participate in agriculture each year has far ranging potential consequences for the household and for others, from the basic health and well-being of the household members to such important issues as land use and land cover change at the larger scale of villages and regions (Parker et al. 2003).

To support each of these claims, I present a pair of binary probit models. The first predicts agricultural participation and the second predicts use of monetized labor in rice agriculture. The results of this descriptive modeling suggest that differentiation is occurring among households with respect to both monetization and rice agriculture and that this differentiation is attributable to shifting social, agricultural, and economic conditions in the region. Specifically, demographic, agricultural, and economic characteristics of households all influence the decision to grow rice, while selective household and agricultural factors alone impact the use of monetized labor. Further, these results are stable across very different periods of time in which a wide array of measured and unmeasured factors likely differ markedly. Lastly, a decomposition comparing the impact of data composition with that of the structural parameters suggests that shifts in the proportion of households growing rice between years are attributable chiefly to shifts in the characteristics of households and villages in the study area, while shifts in the proportion using paid labor are better explained by changes in the values of parameters.

In sum, both of the social phenomena examined in this research are central to the economic viability and cultural identity of the population of Northeast Thailand. But this analysis focuses on the broader theoretical questions of what sorts of factors are associated with monetized exchange and what is distinctive about the process of monetization *viz*. the many other "-izations" that are simultaneously transforming the social landscape. I begin this paper in

Section II with a presentation of a general theory of monetization and then apply it to the specific context of Northeast Thailand. In Section III, I present additional detail about the case and data used, including an extensive discussion of rice agriculture in Nang Rong and the process by which households in this region acquire the labor needed to harvest their rice in a timely fashion. This section also argues that rice agriculture in Nang Rong represents an ideal test case of the more general theory of monetization presented here and elsewhere (Hull 2009a; Hull 2009b). Section IV presents the analysis methodology and a detailed description of the measures used and the theoretical reasons for including each. Section V contains descriptive results and presents and interprets the two probit models. An additional decomposition analysis is also introduced in this section which takes advantage of the repeated waves of data to distinguish unique roles for population shifts and structural changes in producing changes in each outcome. A discussion of the broader significance of the results is found in Section VI, along with responses to the most likely criticisms of the methodology employed in the analysis.

CONCEPTUALIZATION AND THEORY

I define monetization as a process of institutional change in the means and method of exchange that operates at multiple scales.[1] At the level of the individual transaction, monetization is discrete, meaning that a transaction is either monetized or it is not, while at broader levels of aggregation (the neighborhood, the village, the economic sector, the economy, and so on) it is a continuous process of cumulating one or more distinct monetized transactions. This accumulation may not be a simple additive process. Further, monetization, in its most basic formulation, is associated with measureable differences not only in the behavior of individuals, but in the social networks that connect them (Hull 2009b). Successfully transitioning between

[1] The definition and theory of monetization presented here draws heavily upon work presented elsewhere (Hull 2009a; 2009b).

barter-based exchange and money-based exchange (or back again) requires a fundamental change in the information that flows through exchange networks (Dodd 1994). This formulation allows for partial or incomplete monetization of a given economic sector to exist and even to persist.

A fundamental component of all economic transaction is information: information about the other party or parties involved, the goods or other things of value being exchanged, and many other key facts that all inform an actor's decision to engage or not(Plattner 1989). The information that matters in a monetized transaction concerns such important questions as whether the value of a monetary instrument will be constant over time, how it may be redeemed, and who will enforce the redemption and guarantee its value, if necessary. Whether money is introduced to a population from outside, or spreads from one area of life to another in a population that already possesses many of the institutional aspects of money, or even emerges spontaneously, it cannot be adopted without a corresponding change in the informational structure *with regard to the specific domain of life being monetized*. While this information is generally equated with the functions of money – as a store of value, means of exchange, unit of account – it does not in fact characterize money as a substance at all but rather the social institutional structures which regulate the use and flow of money. In this sense, money is the least interesting aspect of monetization. Far more interesting from a sociological viewpoint are the potential changes to the social structures and institutions that control economic exchange. These changes are the central issue of monetization.

The major differences between monetized and non-monetized forms of exchange exist in the information that flows through social networks of transactors. These social networks may themselves be altered by a shift to monetized transactions because of the new informational

requirements (some higher and others lower) of monetized exchange. On the contrary, it may also be the case that the form of exchange is a *response* to the specific type of social network relation that exists between exchange partners. For example, an improvement in the ability of transactors to store value by using money as opposed to a particular bartered item may decrease the need for a transactor to depend upon personal assessments of the exchange partner's reputation and trustworthiness, expanding the realm of possible trade partners. Such an idea has been famously captured in John Steinbeck's oft-shortened statement that "Money not only has no heart but no honor nor any memory." (Steinbeck 2008: 57). But it is equally possible that the existence or lack of trust between partners may determine the form of the transaction, in whole or in part. In either case, a bartered item may depreciate in value quickly for a variety of reasons, but money is depended upon to retain its value under normal circumstances.

The circumstances under which money retains or loses value, unlike those under which it is adopted in the first place, *are* heavily studied in economics. While money is in one sense the enabler, what has really changed with monetization is the decision-making framework of the transactors. It is this fundamental observation that is often overlooked when one focuses on money as the key aspect of change. When money is used as a unit of account, its redemption is tacitly or explicitly guaranteed by a third party – a debtor, a community of traders, a bank, a state. In this sense, money is indeed an invention that exists to reduce the myriad transaction costs associated with economic exchange (North 1981; North 1992). But it is not so much a technological invention as it is a *social* invention in the same way that a mutual insurance group is a social invention designed to help its members spread the costs of unexpected loss over the entire group. In the latter case, one would not likely focus on the paperwork that accompanies the formation of such an organization but the social arrangements of the organization itself, and yet,

in most economic studies of monetization, this seems to be precisely what is done. In truth then, it is not money that is memory-less, it is the transactors themselves, who are freed by virtue of money's third-party backing from many of the burdens of memory associated with barter.

Within this general theoretical understanding of money and monetization, a study must be situated with respect to its specific context. Past studies discussing monetization have treated it as a very general aspect of context, against which other phenomena of interest occur. The present study seeks to bring monetization to the foreground as a subject of interest in its own right. This does not mean that other aspects of context can be ignored, however. On the contrary, it becomes crucial in studying monetization to specify whether one is describing an entire economy, a sector of an economy, a single class of social or economic behavior, or even a single transaction. In addition to carefully specifying the level of analysis, it is important to take account of other concomitant processes of social change that are occurring. Lastly, the social networks linking actors within a given place must be considered as an important element of context that is frequently missing from discussions of many economic phenomena. As noted in the introduction, it is my intent to explore the behavior of households in a specific context with regards to two interrelated behaviors: growing rice, and paying laborers. In order to understand why these specific instances make for a satisfying test case I now examine both the specific data sources and specific elements of the context that are especially important to the present study.

THE CASE

Why Nang Rong?

A number of features of Nang Rong District, Thailand make it a highly appropriate test case to use in understanding monetization. First, on a purely practical level, survey and interview measures of monetization are virtually non-existent, while those that do exist are frequently

premised on an under-theorized, concept of monetization as dichotomous at large scales. Treating monetization as an "either-or" proposition at the scale of a village or nation severely limits understanding of this theoretical construct at these scales. Thus, it is important that the test case selected provide the measures necessary to begin studying monetization at the level of the transaction and the network. The Nang Rong Project, a series of data collections that includes three waves of large, multi-scale surveys conducted in Northeast Thailand in 1984, 1994, and 2000 provides just such micro-level data, along with a rich collection of observations on demographic, economic, and agricultural characteristics of households and villages.

Second, the period in which observations were collected on Nang Rong was one of widespread and rapid social, cultural, and economic change – general conditions under which monetized transactions appear, anecdotally, to also increase. This may be true both because of the greater security and reduced information costs that monetary exchanges offers as opposed barter, or because monetization itself is likely to be an important agent or concomitant of change. The prospective nature of the Nang Rong data allows changes in a wide range of social and economic behaviors to be recorded with a degree of accuracy and reliability not permitted using retrospective measures. The long observational window, on the other hand, permits the exploration of trends over time. Both of these aspects of the data are important to the study of monetization, which may have wide-ranging and long-term effects but may not be accurately recalled in retrospective interviews due to the commonplace character and large number of the economic exchanges involved (Conway 1990; Henry et al. 1994; Schwarz and Sudman 1994).

The Nang Rong Project gathered data on individuals, households, and communities, and did so for a large sample. The large number of individuals (ranging from 34,035 in 1984 to 33,193 in 2000) and households (ranging from 5,860 households in 1984 to 8,638 in 2000), and

the comparatively large sample of villages (51 villages in 1984 that were followed as they grew) provide sufficient statistical power to examine a large number of potential covariates and to provide stable estimates of less common behaviors. The feature of the Nang Rong data that enables the direct investigation of monetized labor is a series of unique and detailed questions asked in 1994 and 2000 about labor used in harvesting rice. Harvesting rice is a labor-intensive task that is largely not amenable to mechanization and other labor-saving technologies, and thus requires many households with even modest landholdings or many members to seek assistance outside their own members (Hull 2007). Information was collected about the nature of each discrete transaction between any two households. That is, a household utilizing workers from several other households could (and sometimes does) pay one, exchange labor with another, and receive help for free from a third. The intense, short-term nature of the rice harvest permits the collection of fairly complete information about all rice harvest labor transactions at a level of detail not usually available and not previously exploited in empirical research. In order to better understand and interpret the significance of the example, I now present a deeper look at rice agriculture in Northeast Thailand.

The Rice Harvest and Rice Labor

Rice agriculture has been central to the economic wellbeing and cultural identity of villages and households in Thailand for centuries (Keyes 1976; Phongphit and Hewison 2001). Northeastern Thailand, where this study is based, is a culturally, socially, and economically distinct region that locals call *Isan*. Cultivation practices in *Isan* differ from rice-growing in other parts of Thailand and beyond in notable ways. In particular, rice-growing in the Northeast has traditionally been smaller-scale, less market-oriented, and less intensive than cultivation in the Central and Northern regions of Thailand. The Nang Rong Projects data suggest that greater than

80 percent of households in the District were engaged in rice agriculture during the decade prior to the period examined here. This high percentage reflects the smallholder tradition and subsistence nature of much agriculture that has been the hallmark of rice agriculture in this region for decades.

In the Northeast, water for irrigating rice is often limited to what can be had through rainfall. Estimates of the proportion of households in the Northeast relying on any form of irrigation other than rainfall vary considerably from year to year during the years examined here, but never range above a third and are often quite lower (Grachangnetara and Bumruntham 2003). Estimates for Nang Rong District drawn from the 1994 and 2000 data are within the same range. Reliance on rainfall alone is often more than sufficient, thanks to large volumes of seasonal rainfall brought by the annual monsoon, but the high variability of both the timing and quantity of rainfall negatively influences overall yield.

During the season reported on in 2000 for example, the weather station in Nang Rong recorded above average rainfall starting in March and continuing through the months of May and June, the months that typically coincide with heavier rains and the start of planting. Overall, rainfall during this season was substantially higher than the 30-year average and this precipitation was well spaced (Thailand Meteorological Department Climatology Division 2002). As a result, average yield in metric tons per *rai* for all rice-growing households in the sample was approximately 2.7 t/ha, slightly above the national average of 2.51 t/ha (United States Department of Agriculture 2009).[2] This contrasts sharply with the season reported on in

[2] Sample tabulations of yields based on 1994 and 2000 Nang Rong Data are only approximations due to the possibility of measurement error and conversion. Households reported rice yield in *tang* in 1994, a unit of volume roughly equivalent to 10kg of dry jasmine rice. Households reported rice yield in *grasops* in 2000, a unit of volume whose weight varies according to the type of rice and other factors. Each household provided estimates of the number of kilograms of rice per *grasop* in 2000 for each of three major varieties. These relationships were used to compute the total kg of rice per household.

1994, which was a year of poor rainfall that also came later than expected (Thailand Meteorological Department Climatology Division 2002). As would be expected in a rainfall-dependent rice economy, yield in that year was around 0.85 t/ha, far below the national average of 2.21 t/ha, and below the average for the Northeast of 1.45 t/ha (Food and Agricultural Organization of the United Nations 2009; United States Department of Agriculture 2009). These figures clearly demonstrate the reduction that can occur in rough rice yields during drought years below what would be possible with adequate and well-timed rainfall.

While some innovations and green technologies have been successfully implemented, most notably the adoption of large tractors and walking tractors for tilling rice paddies prior to planting, the larger suite of available technologies implemented elsewhere has not been widely adopted due to cost and limited gains. In particular, while machines have reduced labor demands during the plowing phase of the rice cycle, the harvest was still carried out almost exclusively by hand during the period examined due to the delicate handling needed to avoid wastage, among other factors (Fukui 1993; see Hull 2007 for a more thorough review of these factors). Herbicides and pesticides are used sparingly and in most cases provide only marginally improved yields in this agricultural context. Chemical fertilizers, by contrast, had become nearly universal by the most recent wave of data collection. In sum, while households in Nang Rong District, like their neighbors throughout the *Isan* region, show a readiness to adopt innovations offering real or perceived gains in agricultural yields, a number of these innovations have proven too costly or of limited effectiveness. As a result, many aspects of rice agriculture across the study area do not look remarkably different today than they might have appeared in decades past.

To return to the central idea, two important questions facing many households in Nang Rong are whether to grow rice and if rice is grown, who will provide labor for the intensive

harvest. Even households that own no land are not barred from growing rice in principle, as an active market for land rental exists. Regarding the first question, Chayonov (1926) argues that in the absence of well-developed markets for labor, household production decisions depend upon household demographic composition, as the household is the sole source of labor, and some empirical work supports this claim (Jacoby 1988, cited in Benjamin 1992). This formulation is likely to be an oversimplification when applied to the *Isan* context, however, because it fails to take into account the precise nature and timing of labor demands associated with differing types of agriculture. In the case of wetland rice in *Isan*, many conditions, including a large number of varieties grown, elevation differences, and intentional variations in planting time, all serve to generate a situation in which rice matures at different times for different households. Treated as individual units, a household's only alternative in the absence of a labor market would be its own members, which could indeed tie production decisions to household demography. But what if one's neighbors have comparatively less work at the time when one's own labor demands are greatest? Labor could potentially be obtained through a promise of providing labor in the future when the roles are reversed. Such a situation is, in fact, exactly the logic that underlies the *long khaek* system of rice labor exchange that was a central feature of agricultural life in Nang Rong for decades.

Thus, households in Nang Rong typically have not one, but two potential sources of labor in the absence of a labor market: household members and exchange labor. The introduction of wage labor, then, is not an entirely new, qualitatively different phenomenon, but rather an alternative to the *long khaek* labor exchange system. Either might function to supplement household labor. The availability of labor for pay is an established feature of the Nang Rong economy, one that has been present for at least two decades prior to the present study (Phongphit

and Hewison 2001). When markets for labor are present, if imperfect, three sources of labor presumably exist: household members, *long khaek*, and wage labor.

In a given year a household determines whether to grow rice (and how much to plant) based upon a number of factors. The most likely factors will be described below in the section on measurement, but labor may be particularly important. Considerable labor is needed to plant rice (and also to transplant, depending on the method of cultivation). Then, the rice requires less labor and attention for several months, mostly in the form of weeding, until it is time to harvest. The factors that could potentially influence how much rice is ultimately produced based upon this initial investment in planting are many, but few outside of the labor invested are under the control of the farmer. As already noted, rainfall exerts a strong force on yields, but rainfall cannot be predicted at the time of planting, nor can such occurrences as loss due to winds or flooding, or a bad year for pests. Likewise, the basic quality of the growing conditions cannot be altered to a great extent once rice has been planted. Well-timed applications of fertilizer may improve yield, but only so much.

Thus, it may be reasonable to assume that the amount of labor that will be required for the harvest at the end of a growing season is a quantity that is only partly knowable by farmers at the outset, and further that beyond ensuring that what rice has been planted survives and thrives there are very few actions a farmer can take to dramatically increase or decrease the final yield. Put simply, by planting *x* amount of land in rice, a farmer is committing to a fixed but unpredictable labor requirement at harvest time. What matters is not so much the raw quantity of rice planted, but the ratio between this quantity and the predicted resources of the household at harvest time. Both of these quantities will continually fluctuate up until harvest time, but at that point, the relationship between labor requirements and available labor at last becomes apparent

to the household. It is at this point that a household estimates how much labor will be needed to harvest all of the rice, how much of that rice will actually be harvested, and who will provide the labor: household members, labor exchange partners, wage laborers, or some combination of all sources.

In sum, households have multiple sources of rice labor. The ability of households to mobilize any one of these sources is likely to be a function of household characteristics, to be explored in the next section. Further, a wide variety of factors may influence both the amount of rice planted initially and the amount of labor required at harvest time. More will be said about the interrelated nature of these household decisions and the implications for modeling in Section V, but first, I present a thorough description of the measurement of the many factors included in the analysis.

METHODS

Dependent Variable Measurement

The rice-growing behavior of the household is operationalized as a dichotomous indicator of whether a household harvested any rice during the previous season. The paid-labor outcome is a dichotomous indicator measuring whether the household used monetized labor. The latter indicator is coded so that a household that paid all of its workers is coded as using "monetized" labor, while one that paid no workers, or mixed strategies, are coded as "non-monetized" with respect to the rice harvest. It appears to be the case in Nang Rong, especially in the year 2000, that monetized labor is no longer the innovation, but the dominant mode of exchange when extra labor is required. For the small number of households that did mix and match bases of exchange, descriptive analysis suggests that they are far more similar to households that pay no workers

than to those that pay all (Hull 2009b). [3] Some detail is sacrificed by treating the dependent variables as dichotomies, but this simplification permits the estimation of the same model at different points in time using the Nang Rong data and other analyses which are an important goal of the present research. It is important to recall that much previous research implicitly treats monetization as a force that is dichotomous at the level of a village or even a national economy – and often as a phenomenon that occurs en masse, instantaneously, and without friction. Thus, the present operationalization, while itself a dichotomy, is still a significant improvement for the measurement of monetization at the micro level.[4]

Independent Variable Measurement

Independent variables reflect four major factors a.) household demographic composition, b.) relevant agricultural characteristics, c.) other economic assets and activities, and d.) general characteristics of the village economic and agricultural context. These four groups of factors are all expected to be related to both the decision to grow rice and to pay laborers. In addition, a fifth potential group of variables – explicit measures of the social network position of households, are argued to be a constant factor of the social context based upon prior work, and so are not

[3] Due to the obvious significance of the operationalization of the primary dependent variable, a subsequent sensitivity analysis was conducted in which the monetization variable was re-coded using the rule, "if any paid labor, then code as monetized." A small number of households were affected by this change. The results reported here were robust to this alternate specification.

[4] In constructing this latter measure, the categories of "free labor" and "exchanged labor" were also collapsed. This reflects both doubts on the part of the author about the lack of a meaningful distinction between these two concepts and uncertainty about the possible alteration of meaning in the course of translation. One does not need to posit a fully rational actor model to question whether any labor is ever given freely. Such "gifts," to use Sahlin's terminology, likely represent one step in a complex ongoing series of exchanges of many different valuables over an extended period of time (Sahlins 1972). The respondents may rightly claim that they neither paid the laborer nor exchanged any labor, and yet this is not the same as saying that the labor was actually free. At the time the interviews were fielded, the study of monetization was not the central purpose. Therefore, it is uncertain whether the interviewers provided enough explanation of the distinction between these concepts for them to be reliably distinguished in this particular analysis. Further, both "free labor" and labor exchange are distinctly different from the major concept of interest: monetized labor. Collapsing these categories reduces the complexity of the modeling task and reduces concerns about measurement error while sacrificing little in the way of substantive interest.

included. A discussion of the reasons for this decision is included in the section on measurement. I explain the theoretical rationale for including each variable as each is operationalized below.

HOUSEHOLD DEMOGRAPHIC COMPOSITION. Eight measures constitute the demographic composition of households in both models. Rather than include a single measure of all household labor, I use separate measures of the number of working age males and females to allow for the possibility of differential effects by gender, age, and membership status. Measures of the number of children and older household members are included separately as these individuals also provide labor, but potentially not to the same extent. In addition, the number of former household members now living in other households nearby is included separately, as these individuals may not be considered laborers by the household in the same way as non-household members. On the other hand, migrants from the household may represent a direct loss of labor to the household (Hugo 1982). But any potential loss of labor generated by migration might be offset by a flow of wealth from the migrant back to the family in the form of remittances which could be used to purchase labor. Thus, separate measures of the number of remitting and non-remitting migrants are included in the model. Lastly, the mean age of the household is included as a simple measure of life-course effects. Controlling for the other household demographic features, one might expect older households to be less engaged in rice-growing, having turned over control of family land resources to children and younger family members.

HOUSEHOLD AGRICULTURAL CHARACTERISTICS. The inclusion of the amount of land owned or used by a household is an important variable in both models. Excluding such measures could potentially lead to model misspecification because the amount of land available to potentially grow rice should be strongly related to a household's likelihood of engaging in rice

agriculture as well as their overall labor needs and probability of using paid labor. But, due to changes in the survey, different measures of agricultural land were obtained in 1994 and 2000. In 1994, households were asked to report on the amount of land that they *owned*. In 2000, an attempt was made to additionally account for each individual parcel a household owned, but this was found to be problematic, so the question was re-written to ask households about the parcels of land that they *used*. Despite the theoretical difference, empirically, the distributions of the two variables display quite similar shapes, ranges, and central tendencies, though differences do exist. Most notably, the 2000 land-used variable displays more instances of households using very small amounts of land, possibly renters of a few *rai* that were not observed with the 1994 measure. It appears to be primarily at the margins of the distribution – among those households *using* small amounts of land and those households *owning* large amounts of land – where wider discrepancies between these measurements exist. Given that these variables are measured six years apart, the similarity between them suggests a reasonable degree of stability. This comports with qualitative research in Nang Rong which suggests that land changes hands slowly, and most transactions take place among family members in conjunction with inheritance {{348 Nang Rong Projects Focus Group Interviews 2004}}. In order to further reduce the uncertainty surrounding the measurement of the "used" variable in 2000 and at the same time increase the comparability across years, the two variables, land owned and land used, are recoded as ordinal variables. Specifically, I create three categories: Households with small (0-15 *rai*), medium (15-45 *rai*), and large (45 or more *rai*) landholdings, based upon an assessment of the distribution of the two variables.[5] This specification has the added benefit of removing concerns about undue influence by the handful of households with very large landholdings.

[5] The *rai* is a Thai unit of land measurement. There are 6.25 *rai* in one hectare, and approximately 2.53 *rai* in one acre.

The model of agricultural participation also includes a dichotomous indicator of whether a household owned any large agricultural equipment. In 1994, household were asked about ownership of large tractors, walking tractors, water pumps, electric generators, and threshers, while in 2000 they were asked about only tractors, small tractors, and threshers. The indicator measure includes all the large agricultural equipment was asked about in each year. Despite these differences, the measure in both years should be a strong predictor of participation in rice agriculture, since such large investments signal a long-term commitment to agriculture.

The model of paid labor use additionally includes a count of the number of non-household members who came to help a household plant its rice. This variable is included as a proxy for the total amount of rice planted, which was not directly measured. This variable should be strongly related to the amount of labor needed to harvest rice, and thus the probability of using paid labor.

HOUSEHOLD ECONOMIC CHARACTERISTICS. The economic resources a household commands are thought to play a role in making paid labor more attainable. Households without any access to cash cannot then pay others to provide them with labor. Income may also influence agricultural decisions by providing alternative livelihoods or, on the contrary, giving the household additional resources to invest in agriculture. An attempt was made to accurately measure the full range of possible income sources and economic opportunities that each household engaged in. As a result, a large number of variables characterizing a household's economic activities can be included in the model. Households in Nang Rong traditionally utilized a diversified economic strategy to minimize overall risk in the event that any one investment should fail. In addition to growing rice, a household might raise livestock such as cattle, pigs, or buffalo, grow a cash crop like cassava, produce charcoal, or participate in such cottage industries

as the production of silk or cloth. While many of these activities are carried out for household use, they all represent possible sources of additional income for the household as well, to varying degrees. For this reason, indicators of a household's engagement in each activity are included in both models.

Further, the overall level of wealth that a household possesses should be included in both models. Unfortunately, no direct measure of the total assets of households was obtained. But measures of household wealth by proxy in the form of material investments may predict participation and labor monetization due to the convertibility of some or all of these assets into cash or their usefulness in agriculture. In 1994 households were asked about consumptive assets which included large televisions, small televisions, VCRs, and refrigerators, while in 2000 they were asked whether they owned large TVs, small TVs, VCRs, telephones, computers, microwaves, washers, one-door refrigerators, and two-door refrigerators. Some assets were considered both productive and consumptive. In 1994 these included cars and motorcycles, while by 2000 the list had been refined to include large motorcycles, small motorcycles, cars, pickups, and large trucks. In both 1994 and 2000, those assets that were considered purely productive were *Itans* (multi-purpose farm engines), large tractors, small tractors, and sewing machines. In each year, the total value of each of these three categories of assets was converted into their value in Thai baht according to the average prices of these goods in Nang Rong District or the nearest locale where they are readily sold.

In addition to these specific calculations of the rough value of the material assets owned by each household, I include two dichotomous indicators as proxies of housing quality and value. First is a measure of whether the household had glass windows at the time of the interview. Second is a measure of whether the household used "old" or "new" fuel sources for cooking.

Sources of fuel classified as old include wood and charcoal, and no fuel at all. Sources of fuel classified as new include propane, electric, and other modern sources.

VILLAGE-LEVEL CHARACTERISTICS. More general macro-level processes and characteristics measured at the village-level, while less proximate, are predicted to relate to household-level decisions. The size of the village population is included in the paid-labor equation for the straightforward reason that this population provides a readily accessible source of additional labor to households. The total amount of rice land in the village is included in the rice-growing equation on the expectation that this measure may capture some variation in growing conditions, and because villages with more rice land may provide other additional agricultural support. This same variable is included in the paid-labor equation with the expectation that villages with more total rice land under cultivation will experience greater competition for labor, and may be more likely to have a strong paid labor market. A measure obtained from group interviews with village elders and headmen that asks whether villagers hired labor from other villages is included in the paid-labor equation. Both equations contain a variable gauging the extent of localized water shortages as assessed by this same group of informants. In 1994, the question about whether households had sufficient water for growing specified only rice cultivation, while in 2000 the question referred to all agriculture generally. A dichotomous measure of whether households in a village had access to piped water to dwellings is included as an indicator of general village development and because such water might be used during periods of extreme drought to keep crops alive (Rindfuss et al. 2007). Lastly, a dichotomous measure of whether the village had a telephone, and thus enhanced contact with broader markets, is included in both models.

HOUSEHOLD-LEVEL SOCIAL NETWORK POSITION. In previous work I provide strong evidence that the household decision to use monetized labor during the rice harvest is consistently associated with that household's position in multiple social networks, especially the rice harvest network itself. Further, these relationships display the sort of multi-scale properties predicted by the theory and several other empirical predictions of the theory (Hull 2009b). It would seem, therefore, that omitting measures of these network properties from the present analysis might naturally lead to misspecification of the model, particularly if these same variables are also related to the other independent variables in the model. But, one of the most important conclusions of that prior work was that these social network associations were extremely consistent over time, despite any number of observed and unobserved shifts in related phenomena. The implication is that these social networks constitute a part of the invariable social context of monetized and non-monetized labor exchange transactions in Nang Rong.

From a more methodological standpoint, there is also a considerable danger that including these variables without a good theory about the directionality of the relationship could introduce endogeneity into the model and possibly bias the resulting coefficient estimates. The question becomes, is it better to include or exclude such measures. I come down firmly on the side of excluding them for the time being because there are strong theoretical grounds for predicting that most social network variables and monetization variables are simultaneous, and therefore require a more complex modeling procedure than can be employed here using these data (Hull 2009b).[6] Further, if the impact of these variables is as constant as suggested by this

[6] Sensitivity tests were conducted in which the models presented here were re-run with the social network measures presented in Hull (2009b) included. The results were not substantively different, with one exception. The three household-level demographic characteristics that are significant in the models presented here in 1994 (counts of the number of adults females and males and the number of dependent children) are not significant when the social network measures are included. This may suggest a greater reliance on network ties over household labor in 1994, but such interpretations should be tempered by the methodological concerns raised in this section. In 1994, all other

prior work, and they share no causal relationship with other predictors, then their omission will not necessarily result in endogeneity bias. It may be helpful to point out again, that the question this research aims to answer is, *within a particular context*, what factors are related to the differentiation of households according to these two important measures? While it is possible that certain elements of the context may not be universally related in the same way to the processes being examined, within Nang Rong, they are presumed to be constants. The broader exploration of the generality of these contextual elements must await cross-national and other context-varying data collections.

Model and Sample

For each year that data were available (1994 and 2000) two separate binary probit models are estimated. The dependent variable for the first model is the dichotomous indicator of whether a household harvested any rice during the previous season. The second dependent variable, also dichotomous, measures whether a household used paid labor to accomplish its harvest. Because the data are multi-level, the observations within each village may not be entirely independent of each other. In order to account for the inflation of standard errors that may result from clustering at the village level, Huber-White robust standard errors are estimated in all models.

The sample used in this analysis differs from that used in previous analyses of monetization due to the inclusion of many more covariates into the model of both outcomes. This introduces a number of purely methodological obstacles to including all available households. Chief among these is that the method of collecting data on the migration behavior of household members requires that at least one member of a household was present during a previous wave of data collection (1984 for 1994, 1994 or 1984 for 2000). Absent from the samples used, therefore,

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relationships remained fundamentally unchanged; in 2000 all relationships remained unchanged. For this reason, the original models, which do not risk the endogeneity problems discussed in this section, are presented.

are those households that were “new” to the villages in a given wave, as the result of in-migration (divided households are kept in the sample). Limiting the sample to this group of households reduces the total sample size from 7331 households in 1994 to 5190 (71 percent of total), and from 8638 in 2000 down to 6920 (80 percent of total). These numbers indicate, among other things, that Nang Rong was still functioning as a frontier region during the period under examination, receiving an ongoing flow of new migrants. When labor monetization is modeled, the households included in the sample are further restricted to only those that grew rice, which results in samples of size 4165 in 1994 (82 percent of rice-growing households) and 5279 in 2000 (76 percent of rice-growing households). The implications of these decisions for the internal and external validity of the analysis will be discussed in Section VI. First, I turn to the presentation of the main results.

RESULTS

The results of the analysis are presented in four stages. First, descriptive statistics for all measures included in the modeling are presented. Second, the model predicting labor monetization is discussed. Third, the results of the model predicting agricultural participation are described. Lastly, an additional analysis is carried out that takes advantage of the two separate observation windows to perform a standard demographic decomposition on the two models.

Descriptive Results

Table 1 provides means and standard deviations for all variables used in this analysis for 1994 and 2000. The column on the left of the table indicates whether a variable was present only in the selection equation (1 variable), the substantive equation (3 variables), or both equations (24 variables). The sample for the second model excludes households that did not grow rice, and therefore descriptive statistics are provided for both samples – the full sample of households and

the rice-growing sample. Basic levels for both dependent variables are also shown in Table 1. As noted earlier, there has been a sizeable expansion in the use of paid labor. In addition to a general increase in the average number of paid laborers used by each household, the percentage of rice-growing households paying all of their laborers rose from 28 to 55 percent over the six year period. The share growing rice was about 82 percent in 1994 and fell to 76 percent in 2000, despite the much better growing conditions in that year.

Overall, differences between the sample of all households and that of rice-growing households are modest, a point that will be emphasized in the discussion. Most notably, when non-rice growing households are removed from the sample a small increase in the mean number of working-age males and females is observed, and a 10 to 20 percent reduction in the average non-agricultural wages earned by a household is seen. This sensibly suggests greater reliance by non-rice growing households on non-agricultural pursuits for a share of their income. All of the variables directly associated with rice agriculture increase when the non-rice growing households are removed, as would be expected, although the extent of this increase is quite modest, reinforcing the picture of smallholder agriculture that characterizes the region. Additional reference to Table 1 will be made below when coefficients are interpreted.

The results of the two independent probit models, one of rice-growing and the other of paid labor use, are presented for both years in Table 2. The similarity of the 1994 and 2000 models allows a simplified interpretation of the results. I first discuss those factors that show similar results in both years together and then the smaller number of variables that yielded different outcomes across years.

The Paid Labor Equation

In the model of labor compensation strategy, a greater number of working age males and females in the households is associated with a reduced tendency to hire laborers and to rely instead on household labor only or labor exchange. The simplest interpretation of this finding is that each working-age member of a household provides labor that would otherwise need to be hired, and likewise makes labor-exchange more feasible. Turning it around, it is the smaller households, with respect to their potential household labor force, that are most likely to pay for labor. The strength of this relationship approximately doubles from 1994 to 2000, perhaps as a result of the presumed greater competition for labor in the latter, wetter year. The number of over-55 household members has the same relationship as working-age members, with households containing more members over 55 showing a reduced tendency to pay all of their extra laborers. This relationship could result from either the substitution effect described above or a preference on the part of influential older household members for the more traditional modes of obtaining labor that affects household decisions, or both.

Turning to agricultural variables, households owning more land and those using more laborers to plant rice are more likely to engage in monetized labor transactions at harvest time. This is exactly what would be expected. These coefficients are consistent and of similar magnitude across years.

Of the economic measures included, only three were significant in both years. The first was the dichotomous measure of whether a household had glass windows or not. Households that cannot afford glass windows, approximately 2 in 5 in 1994, and 1 in 3 in 2000, likely have little disposable cash. Evidence on the uses to which cash remittances are put suggests that rural Thai households are far more likely to spend them on consumption (including household

improvements) rather than productive investments (Fuller et al. 1983: 16-17). This may suggest that households who are unable to obtain money through cash cropping, cottage industries, remittances, local wage labor, or some other activity may face a bind if they produce more rice than can be harvested by their own members and labor exchange partners. However, when one further considers that none of the potential income sources included in the model was significant by itself, it suggests that no one source of income impacts the decision making process for all households. Alternatively, it may suggest that the extensive measures included in this model still fail to provide a complete picture of the sources of cash income utilized by households. Having no direct measure of the total cash resources commanded by each household, proxy measures such as this must suffice for now.

Along the same lines, the total value in baht of productive and consumptive assets owned by households in each year is associated with paid labor use. Productive assets, recall, are things like tractors and sewing machines while consumptive assets include televisions, telephones and the like. Notably, while productive assets matter, it appears that the value of consumptive assets is more closely related to the tendency to pay laborers. This is entirely consistent with the interpretation that cash-strapped households are unable to afford either consumptive assets like televisions, basic home improvements like glass windows, or paid labor. Virtually no change in the magnitude of any of the economic variable coefficients is observed from 1994 to 2000. It is appropriate here to note that the coefficient for the total value of assets that are both productive and consumptive is significant in 2000 but not 1994. Given that the mean value of these assets owned by households, which includes cars and trucks, doubled from 1994 to 2000, it seems reasonable to conclude that these assets are related to paid labor in the same way as other types

in 2000, but that in 1994 automobiles and trucks may well have been viewed as luxury items by paid-labor and non-paid labor households alike, and were simply too uncommon.

It is just as important to also consider what is not associated with monetized labor. As noted, the number of remitting migrants is not significant, and neither is the number of non-remitting migrant household members. The descriptive statistics in Table 1 show that the average household has about 1 remitting migrant for every 4 working-age members in 1994, which fell to 1 migrant for every 6 working-age members by 2000. The same ratio for non-remitting migrants was about 1 for every six in both years. Migration is an important facet of life all across *Isan*, with villages experiencing the absence of large numbers of working-age individuals, especially during the off-season (Limanonda and Tirasawat 1987: 59-66). But despite this, population mobility appears to exert little direct influence on household-level rice harvest labor behavior. Likewise, the fact that most of the other economic endeavors that a household could be involved in are unrelated is consistent with the interpretation that it is not so much *how* a household obtains cash that matters, but rather *how much* cash is obtained, here proxied by the measures of assets included in the model.

Among those factors that were different across years, the village-level factors are especially noteworthy. In 1994, none of these factors was related to paid labor use. In 2000, the number of working-age adults in the village was negatively related to it. This difference may well capture the influence of labor availability. I noted this same general finding in 2000 but not 1994 in previous work, where it was used to argue that the relationship of social network measures to monetization was not explainable by village-level labor demand alone (Hull 2009b).

Here, I would add that wage rates for rice labor in Nang Rong are quite rigid and show fairly modest responsiveness to demand, as well as very little variation across villages. In 1994,

for example, reported wages during periods of high labor for both men and women averaged roughly 58 baht/day with standard deviations of less than 10. Corresponding mean wages during periods of low labor demand were 49 baht/day for both sexes. In 2000, the means and standard deviations for both sexes in 2000 were 105 baht/day and 7.6 during periods of typical demand, which rose to 126 baht/day and 12.8 during periods of peak labor demand.[7] The higher wage rates in 2000 may partially index inflation, but more likely represent the greater demand for rice harvest labor in this year driven by better rains and better yields. Similar to the effect observed at the household level, the greater the number of (presumably better-known) individuals in the village who might provide labor, the less is the chance that a household will need to pay for labor.

Also in 2000, reports of insufficient water for agriculture positively predicted paid labor use. It is likely that this latter difference, in both this and in the rice-growing model interpreted below where the significance also differs, may be attributable to the difference in the measure across years noted above. In 1994, group interviews asked villagers about the water available for *rice* agriculture, while in 2000, this question referred to *all* agriculture. While this provides a convenient explanation for the difference in significance across years, the positive coefficient of the measure in 2000 is contrary to expectations and is something of a puzzle. Most likely, this variable is capturing variations in the overall suitability of a villages location for agriculture in

[7] The availability of these statistics raises the obvious question of why the average wage rate in each village is not included in the model. The reason is that these measures were not created by aggregating household-level information, but from focus-groups of village headman and others who were first asked whether villagers paid others for labor, and *then* what the rates were during different periods. Thus, if a focus group responded that wage labor was not used in the village, the wage rate is not observed. It is demonstrable that households in these villages did pay for labor using the household-level data, but unfortunately, I do not know how much they paid their laborers for both years. As further evidence of the poor predictive ability of the focus-groups, the village-level measure of paid labor use shows no relationship to the household-level measure in the paid-labor model. Thus, while desirable, inclusion of such a measure is not possible with the data used.

2000, which may in turn be related to both the economic welfare of households and the types of economic strategies they use. This finding warrants further attention in future work.

The Rice-Growing Equation

By interpreting what is going on with rice agriculture simultaneously with what is going on with paid-labor behavior, a much richer picture of what is occurring at the ground level in Nang Rong emerges. For the decision to grow rice, having more available household workers, more land and equipment, and greater involvement in "traditional" home industries all exert a positive force on the decision to grow rice in both years. Older households and those with greater household assets were less likely to grow rice in both years, generally. Looking more closely at these variables, the effect of additional household labor is opposite to what was found for the paid labor decision, and consistent with theory. Households with more labor are more likely to grow rice. This finding also implies non-separability of production decisions from household demographics. Larger households in Nang Rong are consistently more likely to engage in agriculture and in 1994 the negative effect of the number of children on growing implies that the competing labor demands of child care are important. Both observations serve as evidence of the imperfection of labor markets in the region. This observation is reinforced by the evidence on wage labor rates cited above.

Having more land and possessing equipment for rice agriculture both function exactly as predicted by theory in the model. Both are stronger predictors of agricultural participation in 2000, suggesting, among other things, that specialization in rice agriculture may be occurring more in 2000. Raising livestock and making charcoal were both associated with a greater probability of growing rice in both years. These subsistence-oriented economic activities are

highly compatible with rice agriculture and are a part of the traditional portfolio of multiple economic activities that has often been commented on by observers in the region.

Among the factors influencing household agricultural participation negatively, there are few surprises. The average age of the household functions as anticipated, as a rough proxy for household life-course effects. Older households participate in rice agriculture less often, all other things considered. This may reflect both the difficult, labor-intensive nature of rice agriculture and the tendency for older individuals to turn over cultivation of family lands to their children. The three measures of the value of household assets also function as expected, with those households possessing more wealth in these assets showing a reduced probability of growing rice, on average. Rice, as the traditional primary subsistence crop of *Isan* and of Nang Rong, continues to be planted and harvested more often by households with few cash resources available for other investments, all things equal. The one exception to this observation is that consumptive assets showed no relationship with the rice-growing decision in 2000.

The few coefficients that lose or gain significance across years for this equation are also telling. The contradictory effects of young and old dependents in a household only influence the decision to grow rice in 1994, suggesting a reduction in the influence of these household members in the calculus of agricultural decision-makers. Likewise, household involvement in cottage industries, besides diminishing from 1994 to 2000 also ceases to impact the rice decision, perhaps reflecting the fact that those households still engaging in cottage industries in 2000 do so for reasons having little to do with household decisions about agriculture. Cassava acts in the same way as household involvement in a cottage industry across models.

Lastly, lack of sufficient water did appear to negatively impact some households' decisions to grow rice in 1994, but not in 2000. For the reasons explained above, the difference

between years may be explained by the slightly different measures used in the two years. In this case, the importance of insufficient local water resources in 1994 for the decision to grow rice makes sense – areas with water shortages saw less rice cultivation on average. The fact that the dependent variable is, more precisely, a measure of whether the household harvested any rice may also be relevant, as regions experience severe water shortages may have seen larger proportions of households plant rice but harvest nothing, a behavior that would otherwise be quite out-of-character with Nang Rong agriculture, where crops are not lightly abandoned in the fields once planted.

Decomposition Analysis

In this section, I apply common decomposition techniques to the 1994 and 2000 models and data to examine the relative contributions of year-specific factors versus sample-specific factors to the overall proportions of rice-growing and monetized households. The decomposition technique estimates the value of each outcome that would have been observed if the population in 2000 had been identical to that in 1994, and vice versa. This is accomplished by taking the coefficients from each model – labeled the 1994 model and 2000 model respectively – and re-estimating the probability of each outcome using the data from the opposite year – labeled the 1994 data and 2000 data. Four scenarios result from each pairing: 1994 coefficients and 1994 data (reality), 1994 coefficients and 2000 data (hypothetical), 2000 coefficients and 2000 data (reality), and 2000 coefficients and 1994 data (hypothetical). A comparison of the real outcomes with the hypothetical outcomes provides additional insight into whether the observed change in

each outcome from 1994 to 2000 may be attributable to changes in the data, changes in the structural parameters, or both. [8]

Table 3 shows the results of this decomposition, comparing these hypothetical predictions with the observed outcomes. The results show a consistent pattern. To best interpret the table, begin with the "like-with-like" entries in the cross-classifications (e.g. 94 Model with 94 Data). For both the upper and lower panels, these entries are equal to the observed frequencies in the populations. These numbers represent a benchmark against which the effects of changing either the model or the data are to be judged. Looking first at the upper panel, the predicted percentage of rice-growing households (the selection equation) is not especially sensitive to reversing the parameters of the 1994 and 2000 models, but declines a few points when the data are reversed. In fact, due to the predicted *increase* in the proportion growing rice that is found when the 1994 data are used to estimate the 2000 model, a difference of nearly 10 percent (86 percent versus 76 percent) can be produced by substituting one data set for the other with the 2000 model parameters. And because changing the data while holding the parameters constant is equivalent to varying the composition of the population, this can be interpreted to mean that the proportion of households who grow rice in Nang Rong District is more responsive to compositional shifts in the types of households than it is to structural shifts in the parameters.

Just the opposite obtains for monetization. Here a small shift is observed in response to data compositional changes, and a larger shift in response to changing structural parameters. In fact, roughly a 20 percent change in the proportion of households monetized occurs when holding the 1994 data constant and varying the set of coefficients used. That is, nearly all of the

[8] In order to generate these estimates, I use microsimulation, in which the actual values for each observation on each variable are retained and fed into the model for each year, as opposed to using means or theoretically interesting values.

observed change from 1994 to 2000 can be reproduced by holding the 1994 data constant and using the 2000 coefficients. However, in this case, some sensitivity to shifting the data is also observed using the 1994 model, though not to the same extent. In plain-English, changes in the predicted level of labor monetization are more sensitive to structural shifts, and to a lesser extent shifts in population composition.

DISCUSSION

The analysis presented here represents the first attempt to empirically model the factors that are related to the monetization of agricultural labor in a specific context using a large, representative data set. Thus, it should not come as a complete surprise that difficulties were encountered in modeling these two phenomena, though fortunately these were mostly of a technical nature. Chief among the acknowledged problems for the present analysis is the difficulty in identifying a viable instrument to use in assessing the potential impact of sample selection bias. As a result, the possibility that sample selection is biasing coefficient estimates in unpredictable ways cannot be ruled out definitively. A second concern is the inclusion of several variables in either model that might be suspected of being simultaneously determined. Although care was taken to select variables for inclusion in the model that were unlikely to be endogenous in this way, some variables such as the amount of rice harvested, were deemed far too important for the overall validity of the model to be otherwise excluded on these grounds alone. Thus, endogeneity might be a concern for the analysis as well.

Both of these potentially threaten the internal and external validity of the conclusions reached in this analysis. In order to better assess the magnitude of each threat, I now discuss these concerns more thoroughly, each in turn.

Potential Threats to Internal and External Validity

SAMPLE SELECTION BIAS. Two decisions were about households to include in this analysis, each of which may have implications for the results. The first was made on strictly technical grounds and can be demonstrated to have no effect on the results. Recall that in order to include variables measuring a household's migrants and former members living nearby, the sample had to be reduced to so-called "old" households – those that had at least one member present during a previous wave of the study – because only these households were asked about migrants. All three migration-related variables proved to have no association with either outcome in the modeling, but this was not known *a priori*, and so the original models are presented, rather than stripped-down models reflecting knowledge gained in the modeling process itself. But as a check against selection bias arising from this particular decision models were re-run without the migration variables on the entire sample of "old" and "new" households with not one coefficient losing or gaining significance and only very minor alterations in the magnitude of coefficients. Sensitivity tests were also run with all "new" households simply coded as having zero migrants and leaving these three variables in the model with the same result.[9] Thus, I am confident that no significant threat to the internal or external validity of the results arises from presenting the original models based only on the sample of "old" households as initially specified.

The second selection concern is that a household's paying laborers is conditioned on the household's participation in rice agriculture. That is, the second variable is only observed for a portion of the sample: those households that grow rice. The value of this measure for the non-rice growing households, *had they grown rice*, is unknown. If rice-growing households are a representative sample of all households, no problem exists. But it is reasonable to suspect that these households differ from the non-rice growing households on both observed and unobserved

[9] The results of any sensitivity tests not specifically reported in this paper are available from the author on request.

characteristics, and further, that these differences may also influence whether a household uses monetized labor or not. Such sample selection bias and can present a threat to both the external and internal validity of the results (Berk 1983).

To address concern about the possible influence of this sample selection on the results, a Heckman two-step selection model is estimated using the same variables employed in the models described above (Heckman 1976; Heckman 1979).[10] A comparison of the results of the Heckman probit model (available in Appendix B) to the results of two independent probit models (presented below) shows virtually no effect on the estimates of either the coefficients or the standard errors for either model or year. It is tempting to conclude from this analysis that no selection bias is present, but this assertion is somewhat tempered by an assessment of the degree to which the assumptions of the Heckman model can be met using the Nang Rong data. The Heckman model is widely acknowledged to be susceptible to underidentification (Berk 1983; Moffitt 2005; Winship and Mare 1992; Woolridge 2003). Identification often, but not always, requires the inclusion of a strong instrumental variable or set of variables, called an exclusion restriction, which is both a good predictor of selection and uncorrelated with the substantive equation (Leung and Yu 2000).

The justification for the exclusion restriction must be made almost exclusively on theoretical grounds when data are observational in nature (Bushway, Johnson, and Slocum 2007). Accordingly, the best (*a posteriori*) instrument available in the present analysis was judged to be the ownership of costly rice-growing equipment by the household, which is highly

[10] This model is estimated in two stages. First, in the "selection equation," the Inverse Mills' Ratio is estimated based upon those factors thought to influence selection, which is essentially a measure the probability of selection based upon a bivariate probit model. Second, in the "substantive equation," this quantity is included as a regressor in an OLS model of the desired outcome. The Heckman selection model can alternatively be estimated using Maximum Likelihood methods. This method must be used when the second variable is dichotomous, as it is in the present analysis.

predictive of participation in rice agriculture. At the same time, the observation that mechanization has had little impact on the rice harvest means that ownership of such equipment will have little direct impact on the method of obtaining labor that a household used. However, this best-choice instrument is not ideal. First, if the economic variables included in the model do not completely measure the economic resources of the household, then there is a possibility that the instrument will be indirectly related to the second outcome, paying labor. Wealthier households should be more likely to own agricultural equipment and also to have the cash resources needed to pay workers, *ceteris paribus*. Second, a multicollinearity test between the predicted Inverse Mills' Ratio and the other variables in the substantive equation suggests a moderate degree of multicollinearity exists in the resulting selection model (Norton, Dow, and Do 2008).[11] This multicollinearity results from the underperformance of the exclusion restriction which fails to produce an Inverse Mills Ratio that is not entirely determined by the variables common to both models.

Both of these observations call into question the effectiveness of the Heckman model for addressing any potential selection bias in the present instance. If so, using a Heckman model in this way is *not* evidence that a sample selection correction is unnecessary, as is often mistakenly presumed. Rather, it is evidence that the best available sample selection correction is not effective in removing this particular bias, *if it is present*. Unfortunately, given the existing data, the extent of this particular form of bias on the estimates cannot be precisely determined as there

[11] The condition numbers for the multicollinearity test on the second model including the Inverse Mills Ratio were 34.7 in 1994 and 36.5 in 2000. Although there is not precise rule of thumb, this indicates that multicollinearity may be a concern. Further, following Jones (2007), an OLS regression of the Inverse Mills' Ratio on the variables in the substantive equation shows that between 79 and 80 percent of the total variance is explained in either year, as measured by the R-squared. Jones provides no formal standards for rejecting the validity of the instrument, but an R-square of this magnitude, by most social science standards, supports the conclusion that the instrument may not be performing optimally (Jones 2007).

is no direct test for the presence of selection bias. In sum, the selection model, *as specified*, provides no improvement over the simpler, independent models approach.

However, the threat of selection can still be addressed in another, less direct way. It is straightforward to show that the restricted samples used in this analysis do not differ in meaningful ways from the full possible sample of households *on observed characteristics*. This can be ascertained through a comparison of the basic descriptive statistics reported in Table 1, already accomplished in Section V. A more formal way to assess this is to use the parameter estimates generated by the 1994 and 2000 model to generate another set of predicted probabilities of using monetized labor. This time, I use the mean values of all variables in the model derived from the select sample and compare the resulting predictions of the model to the predictions made when the means for all possible households are used. To be sure, this only partially answers the question of what might have happened if all households had been included. Because the dependent variable is not observed for non-rice growing households, they are unable to contribute to the estimation of the model, but once the model is estimated, it shows very little responsiveness to including these households (see Table 4). The largest difference in predictions is a drop of 4 percent, from 56 percent for the select sample to 52 percent for the full sample, in the probability of paying laborers in the year 2000. Both sets of predictions are also consistent with the actual observed values for the monetization measure. All of this indicates that unless the 1000 or so households in 1994 and the 1600 households in 2000 that did not grew rice would have substantially altered the parameters of the models themselves by their inclusion, the internal validity of the results will remain unaffected. The author readily admits of no way of testing for this final possibility in the specific case of monetization at present. The Nang Rong dataset already represents a rare case, and as such, an alternative test case that simultaneously measures

comparable dependent variables and permits the identification of a strong instrumental variable for selection modeling does not exist at present. This points to the importance of designing future data collection efforts with a specific eye toward identifying such instruments *a priori* if possible, and if this is not possible, of at least measuring more potential instruments including environmental, ecological and geographic variables (Moffitt 2005).

ENDOGENEITY AND SIMULTANEITY. The analysis performed here is presented intentionally as exploratory and descriptive in its orientation, and not as a fully confirmatory or explanatory piece of research. This befits the study's status as a novel empirical exploration of a topic previously relegated only to the social and economic context of research. With any such study, much further work is required to firmly establish that the causal linkages implied are in fact valid, and in particular that they are non-spurious and that the direction of influence has been properly identified (Bollen 1989). In interpreting the various relationships identified here, a simple one-way causal interpretation may not be fully warranted at present. Thus caution, as well as further replication of the analysis, is especially warranted.

While the suggestion that it is household demography and wealth that influence a household's ability or willingness to grow rice or hire labor in a given year has considerable *prima facie* validity, it cannot be ruled out at present that these latter behaviors might have some influence on the former as well. If a household is particularly successful in its rice-growing efforts, this may lead to greater wealth and possibly even household size over the long term, creating a mutually reinforcing relationship. This reverse causal path is almost certainly weaker and less direct than the path from wealth and household size to the key outcomes. However, the specific approach employed in the present work precludes strong explanatory causal statements.

Readers are advised to treat the associations found here as just that – correlations. As such, they are still of considerable value in constructing a theory of which households within this context are most likely to engage in agriculture and to use monetized labor. For one thing, the absence of statistical relationships anticipated based on theory would generally falsify that theory. That relationships of the sort predicted by the general theory of monetization presented here were found is encouraging. But, these relationships are also consistent with an underlying casual model in which the independent variables in the model are, in actuality, causes of the outcomes in question. Better confirmation of this causal model must await additional data.

Conclusions

This analysis has demonstrated that a number of key demographic, economic, and agricultural characteristics of households and villages are correlated with the household decisions to grow rice and to pay laborers. Taking a synoptic view of the many independent findings, three major factors consistently matter for both the decision to pay laborers and to grow rice. First is the labor available to the household from existing members. Second is the endowment of land and equipment that a household is able to exploit. Third is the total value of material assets that a household possesses. While the measures of land and equipment display a reliable and fairly unremarkable positive relationship with both outcomes across years, the household demographic and wealth measures are related to the two outcomes in opposite ways. Larger, wealthier households are generally more likely to grow rice and less likely to pay laborers if they do. Smaller, less wealthy households are correspondingly less likely to grow rice and more likely to pay laborers if they do so.

Considering general trends in just these three major factors over the past two decades provides some interesting observations about the possible nature of change in the region.

Available evidence suggests that the average size of rice land holdings of households was not changing markedly in the region during the period under consideration and for some time before, leading this factor to contribute little to any potential change if it continues unaltered. In contrast, the trend in Nang Rong District, and much of Thailand, has been toward decreasing household size over the past two decades. Likewise, a steady trend toward greater household material wealth across the District in recent decades has been observed in Nang Rong and elsewhere. Taken together, these trends would argue in favor of reduced participation and greater monetization of labor in the future if they continue unabated. If the average size of households continues to decline as average wealth increases, the resulting smaller (and likely more numerous) wealthier households would be predicted by both the 1994 and 2000 models to be less involved in agriculture and to rely more on paid labor during the harvest.

Moreover, the decomposition analysis suggests that the observed changes in the proportion of households growing rice may be less amenable to reversal than changes in the proportion of households using fully monetized labor. The reason, recall, is that changes in the former were better explained by the changing characteristics of the population itself, while changes in the latter could be explained almost entirely by different values of the parameter estimates. The characteristics of the population that mattered for the rice-growing decision – size of household, mean age, land holdings, and even value of most large consumptive assets owned, such as refrigerators and television sets – while no doubt part of the constantly shifting context in which these decisions take place, are not likely to display wild shifts from year to year. It is the values of these measures that most influences the rice-growing decision, while the proportion of paid labor is more responsive to *the way* in which these factors matter in a given year which can change even as the values of these variables remain fairly constant. Taken together, the findings

presented here provide evidence that a real, secular decline in the proportion of households participating in rice agriculture is likely to be taking place.

This evidence for a decline in the proportion of households growing rice comports well with qualitative evidence from the field, the reality of multiple new forms of livelihood that are increasingly viable in Nang Rong, and the simple fact that 2000 was a better year for growing rice. According to both intuition and the decomposition analysis, proportionally *more* households would have been expected to grow and harvest rice in 2000, exactly the opposite of what was observed. That the predictions of a fairly abstract demographic test of the model closely parallel simple intuition and experience about what types of behaviors ought to be observed in a year of good rainfall provides a nice result, one that gives additional validity to the model and supports the theory presented here.

But if the proportional reduction in households growing rice is indeed a more permanent feature of the shifting agricultural landscape in Nang Rong, the same cannot be said conclusively for the proportion of households engaging in various methods of obtaining labor. This feature of agricultural and economic behavior may be highly responsive to yield, labor availability, and other structural conditions present at the time of the harvest. This too, conforms quite well to qualitative evidence that suggests Nang Rong farmers to be highly adaptive, responsive decision-making agents. Throughout decades of contending with unpredictable volume and timing of rain, crop pests, political, economic, and cultural isolation from the rest of Thailand, poverty, and unreliable labor supplies due to out-migration, among other challenges, the households of Northeast Thailand have become highly adept at using whatever resources are most abundant at a given time and place. If household labor is abundant one year and rice yields are low, then household labor may be used exclusively in that year. If during the next year, yields far outpace

household labor supplies, the household may turn to exchange with the neighbors, paid labor, or both. It is precisely this flexibility that makes the same type of concrete prediction based on observations from two points in time unsupportable in the same way as inferences about rice cultivation.

Fortunately, the weaknesses of the present analysis that have been identified here, are readily remedied through the collection of new data intended for the primary purposes of exploring monetization, rather than the use of available secondary data. While secondary data are an excellent starting point, and often provide the justification for such intensive, expensive new data initiatives, as this research does, one must constantly confront the challenge of working with measures that were never intended to capture the types of novel distinctions and relationships that are often required by new theory. It is my hope that by exploring the empirical findings, theoretical and practical significance, and methodological challenges of a formal study of monetization as I have done here, that I can stimulate these types of new research endeavors, particularly those that bridge social network, economic, and environmental or biophysical domains. These types of integrated interdisciplinary data sources will be indispensible to the replication and verification of the models presented here, as well as a fuller understanding of the process of institutional change that is monetization and its precise theoretical linkages.

TABLE 4.1: Descriptive Statistics for Full and Rice-Growing Samples, All Variables

Variable in Equation:		Variable Description	Full Sample 1994		2000	
Grew Rice	Paid Labor		n=5109 Mean	StdDev	n=6920 Mean	StdDev
		Dependent Variables				
X		Indicator: Household Harvested Rice During Last Season (Household Did Not Grow Rice During Last Season)	0.82	0.34	0.76	0.43
	X	Indicator: Household Used Paid Labor (Household Used Free or Exchange Labor)	--	--	--	--
		Household Demographic Characteristics				
X	X	Count of Males Age 13-55 in Household	1.27	0.98	1.20	0.92
X	X	Count of Females Age 13-55 in Household	1.39	0.89	1.28	0.85
X	X	Count of Children under Age 13 in Household	1.03	1.06	0.96	0.96
X	X	Count of Persons over Age 55 in Household	0.70	0.81	0.69	0.81
X	X	Count of Former Household Members Living Nearby	0.02	0.19	0.01	0.12
X	X	Count of Household Migrants who Remited Goods or Money Last Year	0.66	1.02	0.43	0.78
X	X	Count of Household Migrants Remitting No Goods or Money Last Year	0.42	0.83	0.45	0.87
X	X	Mean Age of All Household Members	33.83	12.21	34.84	12.99
		Household Agricultural Characteristics				
X	X	Indicator: Household Owned or Used Between 15 and 45 Rai of Land	0.53	0.50	0.42	0.49
X	X	Indicator: Household Owned or Used More Than 45 Rai of Land (Household Owned Between 0 and 15 Rai)	0.13	0.34	0.05	0.21
	X	Total Number of Persons Household Used to *Plant* Rice	2.14	4.92	5.05	6.56
X		Indicator: Household Owned some Type of Large Agricultural Equipment (Household Owned No Large Agricultural Equipment)	0.22	0.41	0.39	0.49
		Houshold Economic Characteristics				
X	X	Indicator: Household Grows Cash Crop (Cassava) (Household Does Not Grow Cassava)	0.13	0.33	0.08	0.27
X	X	Indicator: Household Participates in a Cottage Industry (Household Does Not Participate in Any Cottage Industries)	0.19	0.39	0.08	0.26
X	X	Indicator: Household Raises Large Livestock (Buffalo, Cows, Pigs) (Household Does not Raise any Large Livestock)	0.61	0.49	0.34	0.47
X	X	Indicator: Household Makes Charcoal (Household Does not Make Charcoal)	0.59	0.49	0.72	0.45
X	X	Indicator: Household Relies on a "New" Source of Fuel (Household Relies on a "Traditional" or no Source of Fuel)	0.03	0.18	0.06	0.23
X	X	Indicator: Household Has Water Piped into Home (Household Has No Water Piped into Home)	0.13	0.34	0.38	0.48
X	X	Indicator: Household Dwelling Unit has Glass Windows or Window Frames (Household Dwelling Unit Has No Glass Windows or Window Frames)	0.59	0.49	0.69	0.46
X	X	Total Consumptive Assets Household Possesses, in 1,000 Baht	7.2	5.5	8.4	8.0
X	X	Total Productive Assets Household Possesses, in 1,000 Baht	11.8	28.7	30.1	52.7
X	X	Total Productive/Consumptive Assets Household Possesses, in 1,000 Baht	38.5	145.2	70.9	197.0
X	X	Household Wages Earned in Non-Ag Labor Past 3 months, in 1000 Baht	497.1	2964.3	1057.5	5025.5
		Characteristics of the Village				
	X	Count of Persons Age 13-55 Living in Village	482.17	159.88	524.24	173.24
	X	Village Elders Report that Villagers Used Labor from Other Villages	0.57	0.50	0.76	0.43
X	X	Count of Total Number of Rai Devoted To Rice Agriculture in Village	2190.8	908.9	1931.2	852.8
X	X	Indicator: Village Elders Reported Insufficient Water for Rice/Agriculture (Village Elders Reported Sufficient Water for Rice/Agriculture)	0.92	0.27	0.25	0.44
X	X	Indicator: Village Had at Least One Telephone (Village Had No Telephone)	0.13	0.34	0.38	0.48

TABLE 4.1 (Cont'd): Descriptive Statistics for Full and Rice-Growing Samples, All Variables

Variable I in Equation:		Variable Description	Rice-Growing Sample 1994		2000	
Grew Rice	Paid Labor		n=4165 Mean	StdDev	n=5279 Mean	StdDev
		Dependent Variables				
X		Indicator: Household Harvested Rice During Last Season	--	--	--	--
		(Household Did Not Grow Rice During Last Season)				
	X	Indicator: Household Used Paid Labor	0.28	0.45	0.55	0.50
		(Household Used Free or Exchange Labor)				
		Household Demographic Characteristics				
X	X	Count of Males Age 13-55 in Household	1.38	0.97	1.33	0.90
X	X	Count of Females Age 13-55 in Household	1.48	0.87	1.40	0.81
X	X	Count of Children under Age 13 in Household	1.07	1.06	1.02	0.96
X	X	Count of Persons over Age 55 in Household	0.67	0.81	0.65	0.81
X	X	Count of Former Household Members Living Nearby	0.03	0.19	0.01	0.11
X	X	Count of Household Migrants who Remited Goods or Money Last Year	0.66	1.01	0.43	0.77
X	X	Count of Household Migrants Remitting No Goods or Money Last Year	0.39	0.80	0.42	0.83
X	X	Mean Age of All Household Members	32.48	10.45	33.03	10.71
		Household Agricultural Characteristics				
X	X	Indicator: Household Owned or Used Between 15 and 45 Rai of Land	0.59	0.49	0.55	0.50
X	X	Indicator: Household Owned or Used More Than 45 Rai of Land	0.14	0.35	0.06	0.24
X	X	(Household Owned Between 0 and 15 Rai)				
	X	Total Number of Persons Household Used to *Plant* Rice	2.63	5.33	6.62	6.79
X		Indicator: Household Owned some Type of Large Agricultural Equipment	0.26	0.44	0.50	0.50
X		(Household Owned No Large Agricultural Equipment)				
		Houshold Economic Characteristics				
X	X	Indicator: Household Grows Cash Crop (Cassava)	0.15	0.35	0.10	0.30
X	X	(Household Does Not Grow Cassava)				
X	X	Indicator: Household Participates in a Cottage Industry	0.22	0.41	0.09	0.28
X	X	(Household Does Not Participate in Any Cottage Industries)				
X	X	Indicator: Household Raises Large Livestock (Buffalo, Cows, Pigs)	0.69	0.46	0.40	0.49
X	X	(Household Does not Raise any Large Livestock)				
X	X	Indicator: Household Makes Charcoal	0.64	0.48	0.80	0.40
X	X	(Household Does not Make Charcoal)				
X	X	Indicator: Household Relies on a "New" Source of Fuel	0.02	0.15	0.03	0.18
X	X	(Household Relies on a "Traditional" or no Source of Fuel)				
X	X	Indicator: Household Has Water Piped into Home	0.13	0.34	0.38	0.48
X	X	(Household Has No Water Piped into Home)				
X	X	Indicator: Household Dwelling Unit has Glass Windows or Window Frames	0.59	0.49	0.68	0.47
X	X	(Household Dwelling Unit Has No Glass Windows or Window Frames)				
X	X	Total Consumptive Assets Household Possesses, in 1,000 Baht	7.0	5.1	8.0	6.8
X	X	Total Productive Assets Household Possesses, in 1,000 Baht	13.8	30.2	38.4	55.5
X	X	Total Productive/Consumptive Assets Household Possesses, in 1,000 Baht	28.7	113.0	58.9	144.5
X	X	Household Wages Earned in Non-Ag Labor Past 3 months, in 1000 Baht	405.8	2243.9	906.6	4007.4
		Characteristics of the Village				
	X	Count of Persons Age 13-55 Living in Village	481.06	159.98	522.36	175.28
	X	Village Elders Report that Villagers Used Labor from Other Villages	0.57	0.50	0.77	0.42
X	X	Count of Total Number of Rai Devoted To Rice Agriculture in Village	2197.6	899.6	1949.4	848.6
X	X	Indicator: Village Elders Reported Insufficient Water for Rice/Agriculture	0.92	0.28	0.26	0.44
X	X	(Village Elders Reported Sufficient Water for Rice/Agriculture)				
X	X	Indicator: Village Had at Least One Telephone	0.12	0.33	0.35	0.48
		(Village Had No Telephone)				

TABLE 4.2: Independent Probit Models of Paid Labor Use and Rice Growing (With Huber-White Robust Standard Errors at Village Level)

Variable	1994 Coeff	1994 StdErr	2000 Coeff	2000 StdErr
Independent Probit Model I: Used Paid Labor				
Household Demographic Characteristics				
Males 13-55	-0.050 *	0.023	-0.120 ***	0.025
Females 13-55	-0.069 **	0.026	-0.102 ***	0.026
Children under 13	-0.012	0.030	-0.022	0.028
Older members over 55	-0.092 **	0.035	-0.100 ***	0.029
Former Members	-0.042	0.089	-0.027	0.155
Remitting Migrants	0.017	0.025	0.006	0.023
Non-Remitting Migrants	-0.038	0.028	-0.035	0.022
Mean Age	0.002	0.004	0.000	0.003
Household Agricultural Characteristics				
15-45 Rai of Any Land	0.301 ***	0.050	0.409 ***	0.043
45+ Rai of Any Land	0.471 ***	0.070	0.398 ***	0.084
(0-15 Rai of Any Land)				
Number of People Who Helped Plant Rice	0.061 ***	0.010	0.059 ***	0.007
Houshold Economic Characteristics				
Grows Cassava	-0.027	0.108	-0.030	0.073
(No Cassava)				
Cottage Industry	0.156 *	0.068	0.007	0.076
(No Cottage Industry)				
Large Livestock	0.040	0.068	0.053	0.041
(No Large Livestock)				
Makes Charcoal	-0.012	0.059	-0.033	0.050
(No Charcoal)				
Piped Water	0.139	0.074	0.055	0.053
(No Piped Water)				
Glass Windows	0.194 ***	0.050	0.181 ***	0.043
(No Windows)				
"New" Fuel	0.231	0.152	0.100	0.123
("Traditional" Fuel)				
Consumptive Assets, in 1000 Baht	0.026 ***	0.006	0.027 ***	0.004
Productive Assets, in 1000 Baht	0.002 *	0.001	0.002 **	0.001
Productive/Consumptive Assets, in 1000 Baht	0.000	0.000	0.001 ***	0.000
Non-Agricultural Wages, in 1000 Baht	0.000	0.000	0.000	0.000
Characteristics of the Village				
Village Adults 13-55, in 100s	0.000	0.000	-0.001 *	0.000
Elders ReportUsing Labor from other Villages	0.055	0.079	-0.020	0.068
Village Rice Land, in 1000 Rai	0.000	0.000	0.000	0.000
Insufficient Water	0.010	0.098	0.136 **	0.052
(Sufficient Water)				
Telephone in Village	0.106	0.081	0.062	0.063
(No Telephone in Village)				
Constant	-1.436 ***	0.236	-0.481 **	0.161
N Obs	4165		5279	
Overall Model Wald $\chi 2$	306.58 ***		642.63 ***	

Notes: * p <= 0.05, ** p<= 0.01, *** p<=0.001

TABLE 4.2 (Cont'd): Independent Probit Models of Paid Labor Use and Rice Growing (With Huber-White Robust Standard Errors at Village Level)

TABLE 2 (Cont'd) Variable	1994 Coeff		1994 StdErr	2000 Coeff		2000 StdErr
Independent Probit Model II: Grew Rice						
Household Demographic Characteristics						
Males 13-55	0.254	***	0.041	0.190	***	0.036
Females 13-55	0.149	***	0.040	0.218	***	0.035
Children under 13	-0.100	**	0.036	-0.044		0.036
Older members over 55	0.107	**	0.041	0.030		0.038
Former Members	0.247		0.167	-0.122		0.183
Remitting Migrants	-0.011		0.026	-0.016	***	0.003
Non-Remitting Migrants	-0.051		0.028	0.006		0.035
Mean Age	-0.020	***	0.004	-0.061	**	0.023
Household Agricultural Characteristics						
15-45 Rai of Any Land	0.702	***	0.065	2.564	***	0.196
45+ Rai of Any Land	0.397	***	0.104	1.247	***	0.344
(0-15 Rai of Any Land)						
Agricultural Equipment	1.649	***	0.184	2.469	***	0.195
(No Agricultural Equipment)						
Houshold Economic Characteristics						
Grows Cassava	0.268	*	0.122	0.119		0.243
(No Cassava)						
Cottage Industry	0.325	***	0.084	0.144		0.097
(No Cottage Industry)						
Large Livestock	0.799	***	0.050	0.450	***	0.068
(No Large Livestock)						
Makes Charcoal	0.362	***	0.058	0.472	***	0.057
(No Charcoal)						
Piped Water	0.095		0.098	0.029		0.070
(No Piped Water)						
Glass Windows	-0.056		0.067	-0.088		0.067
(No Windows)						
"New" Fuel	-0.302	*	0.135	-0.234	*	0.097
("Traditional" Fuel)						
Consumptive Assets, in 1000 Baht	-0.026	***	0.005	-0.008		0.006
Productive Assets, in 1000 Baht	-0.003	*	0.002	-0.003	***	0.001
Productive/Consumptive Assets, in 1000 Baht	-0.001	***	0.000	-0.001	***	0.000
Non-Agricultural Wages, in 1000 Baht	0.000	*	0.000	0.000		0.000
Characteristics of the Village						
Village Rice Land, in 1000 Rai	0.000		0.000	0.000		0.000
Insufficient Water	-0.292	*	0.117	-0.015		0.098
(Sufficient Water)						
Village Telephone	-0.082		0.133	-0.128		0.084
(No Village Telephone)						
Constant	0.714	**	0.240	0.122		0.198
N Obs	5109			6920		
Overall Model Wald $\chi 2$	1241.08	***		939.53	***	

Notes: * p <= 0.05, ** p<= 0.01, *** p<=0.001

TABLE 4.3: Decomposition Using Probit Predicted Probabilities

Grew Rice		
Pr(Paid Labor=1)	1994 DATA	2000 DATA
1994 MODEL	81.4%	77.1%
2000 MODEL	85.8%	76.3%
Used Paid Labor		
Pr(Grew Rice=1)		
94 MODEL	26.3%	35.2%
00 MODEL	47.7%	50.5%

TABLE 4.4: Predicted Probabilities of Monetized Labor Using Means of Full and Select Samples

Grew Rice Pr(Paid Labor=1)	Means: Rice Households Only	Means: All Households	Actual Observed Values
1994 Data and Model	26.9%	25.5%	27.9%
2000 Data and Model	56.3%	51.6%	54.9%

CHAPTER 5

CONCLUSION TO THE DISSERTATION

REVIEW OF MAJOR FINDINGS AND SIGNIFICANCE

In Chapter 2, I presented revised conceptual definitions of money and monetization which synthesized the strongest elements from Marxist and Simmelian analyses of money with contemporary scholarship. This new theoretical framework incorporates institutional and social network views of the role of money in society and the process of social change that is monetization. The theory was shown to have improved utility to theorists over more conventional understandings of money and monetization, and has the additional benefits of suggesting new research problems and supporting new collaborations between researchers who are studying different aspects of the same core process. This chapter was also aimed at reminding social scientists that the sociological perspective can make a considerable contribution to the study of money. Radford's classic account of monetization in a German P.O.W. camp was shown to support this revised interpretation and, in fact, the revised theory explained several otherwise puzzling aspects of the account, including the rapidity with which the institution of money emerged in the camps, and the sensitivity of monetary exchange to the social conditions of the camp.

Chapter 3, informed by the theory from Chapter 2, continued to develop an empirically grounded theory of monetization. In it, an attempt was made to better distinguish between traditional in-kind forms of exchange and monetized exchange, both traditionally identified in an

"I know it when I see it" fashion that is inadequate from a scientific perspective. I utilized the insights of sociological exchange theory and social network analysis and theory to derive five specific hypotheses specific to the context of rice harvest labor in Northeastern Thailand. Based upon the exploratory results presented, the *caveat mutator* burden does appear to influence the pattern of exchange in systematic ways. The empirical analysis provided strong support for all five specific predictions about network properties associated with monetized exchange at two very different points in time. The analysis therefore supports the assertion that the theory describes a stable, underlying condition in labor exchange networks, and exchange networks more generally.

In Chapter 4, I set out to identify the general sociological, demographic, and economic factors that are associated with a particular form of monetized exchange. In this chapter, I presented a pair of probit models that were related by the nature of the selection into the specific exchange behaviors. The first descriptive model predicts that agricultural participation is associated with the demographic, agricultural, and economic characteristics of households. The second model predicts that use of monetized labor in agriculture is related to household and agricultural factors alone. Further, these results were stable across very different periods of time in which a wide array of measured and unmeasured factors differed. A decomposition comparing the impact of data composition with that of the structural parameters suggested that shifts in the proportion of households growing rice between years are attributable chiefly to shifts in the characteristics of households and villages in the study area, while shifts in the proportion using paid labor are better explained by changes in the values of parameters.

GENERAL IMPLICATIONS FOR FUTURE STUDIES OF MONETIZATION

At the outset of this work, I expressed a hope that, by its end, readers might be satisfied by the theoretical and empirical progress made toward a better understanding the role and significance of monetization in many aspects of social life. But such a hope ignores a common outcome of scientific inquiry: more numerous and better refined questions. The future research directions warranted by each chapter have been traced individually, but it is worth taking the time to present a more unified set of general suggestions.

First, the theory presented in Chapter 2, and elaborated in Chapter 3, requires more attention. A fully developed theory of monetization is too large a task for a single researcher or a single set of articles. Many implications remain to be drawn from the basic elements of the theory and subsequently tested. So too, the implications derived and tested in these chapters require extensive replication and testing in other contexts before they can potentially take a place among other established elements of sociological understanding. The question of *why* some types of exchange continue to be monetized while others are not has been answered in the particular (monetized exchanges enable some of the trust requirements of an exchange to be shifted to an institutional agent) but the underlying motivations remain unexplored. If monetary exchange is so much more efficient, why does non-monetized exchange continue to exist at all? More work along the lines of Zelizer's (1989) analysis of the multiple layers of meaning embedded in different types of economic transaction can serve as a model for these types of investigations.

Second, and more fundamental, questions linger about what precisely occurs when exchange becomes monetized, that is, when money, whatever it is, becomes an acceptable means of payment. Money is a powerful innovation, with demonstrated and widely recognized capacity to drastically restructure human social relations. This was a major message of Marx's Capital

and Simmel's Philosophy of Money and these observations hold no less relevance for contemporary society. Which specific social phenomena are influenced by the way social exchange is conducted, and how? It has been suggested by authors cited in these papers that the introduction or proliferation of monetary exchange into an economy may promote such varied outcomes as the rapid transmission of AIDS through emerging transactional sex (Caldwell and Caldwell 1993) and the artificial inflation of measures of national economic growth like the Gross Domestic Product through the incorporation of formerly non-monetized transactions such as child care and domestic work (Benavot 1989; Bornschier, Chase-Dunn, and Rubinson 1978; Chase-Dunn, Kawano, and Brewer 2000; Lloyd 1991; London and Williams 1988; Schnaiberg and Reed 1974). These questions can only be addressed through careful empirical studies that are better able to measure the extent of monetization and model these potential causal relationships with other factors.

Third, it has been suggested several times throughout these chapters that a major obstacle to the study of monetization in the past has been the predominant disciplinary division of research labors. Thus, I have attempted to demonstrate the benefits of a more interdisciplinary approach to the topic, at least where theory is concerned. The recognition that a variety of social phenomena are best studied using the combined expertise of multiple disciplines is not necessarily new, but does appear to be gaining institutional support from funding agencies, outlets for research publication, and academic departments responsible for educating new scholars and grating recognition. These are all the essential elements identified as necessary to the emergence of a new movement in academia by Frickel and Gross (2005) in their general theory of scientific and intellectual movements. Thus it may portend greater acceptance for

interdisciplinary research going forward. This is good news for the development of an interdisciplinary science of money and such important social phenomena as monetization.

Fourth, and not to be lightly dismissed, is the observation that considerable political persuasion may be required to convince researchers in many disciplines who have been long accustomed to viewing monetization as a limited, well-understood concept to reexamine this position. This effort would be greatly aided by the additional empirical demonstrations of the significance of monetization called for above. To this end, the annotated bibliographies and categorized literature reviews found throughout this dissertation should provide an excellent starting point for other researchers interested in incorporating monetization into their work more directly.

SPECIFIC IMPLICATIONS FOR DATA AND MEASUREMENT

Lastly, existing sources of data have been generated according to existing conceptualizations of money and monetization, a principal limitation of every set of observations about the world. One cannot measure what one cannot imagine or conceptualize. Kuhn made this point prominently in the Structure of Scientific Revolutions though he was certainly not the first to remark on the intimate relationship between the conceptual model of a thing and our abilities to observe its properties. Kuhn's suggestion that a key function of paradigms is to direct researchers where to look for answers has the inseparable corollary that well-accepted theories may also limit us from seeing or making sense of things not illuminated by such understandings. Thus, what types of novel observations and data are required and implied by the revised theory and the conclusions reached thus far in the three chapters here? I wish to suggest two major approaches to collecting new and better data on the social phenomenon of monetization.

First, there is an important role for additional qualitative research that is exploratory in nature. Such research is important both for identifying additional elements that may help to better distinguish monetized exchange from non-monetized exchange and for shaping the research tools used to formally evaluate theoretical propositions. Of particular interest would be explorations into the attitudes of actors towards different types of exchange. Which types of information do they privilege in evaluating the riskiness of a given transaction? Where do they acquire this information? Both the original anthropological studies that informed these aspects of the theory in Chapter 2, and studies like that of DiMaggio and Louch (1998) which investigate the relationship between social networks and economic exchange can serve as useful models for further research.

Second, many existing data sets, large and small may yet hold untapped potential to provide insights into monetization. But, what this also suggests is that incorporation of small modules into well-established data collection efforts might be easily carried out. Researchers already investigate many aspects of exchange behavior, institutions, and social networks. What could help the study of monetization immensely would be the addition of questions probing the specific requirements and context of a given set of regular economic transactions.

The specific question, of course, will require extensive validity testing and revision. When fielded, the analyses presented here suggest that they should initially be targeted at a type of economic transaction closely bounded in time in space and at a community of actors that can be readily identified and bounded. This latter requirement is often challenging due to the overlapping nature of many networks (Wasserman and Faust 1994). A useful context to continue the investigation would be the study of seasonal economic activities in semi-autonomous (or highly exclusive) communities like the villages of Nang Rong. As an alternative the electronic

marketplaces that have emerged in recent years might provide a powerful illustration of the universality of the basic propositions of the theory.

Thus, surprisingly, examples of basic questions investigating monetization in populations suggested throughout these chapters are as appropriate for villagers living in comparatively remote locations who might be experiencing monetization for the first time as they are for electronic consumers in the United States, already intimately acquainted with money in all its forms, who may shop the internet from the comfort of their own homes. It is this consistent universality of human exchange – noted by Simmel and Marx, emphasized by Radford, and illustrated throughout this dissertation – that should compel sociologists to pursue the types of analysis suggested here with the goal of better understanding yet another fundamental human institution.

Appendix 1A
Full Matrix of Pearson Correlations among Village Characteristics and Rice Harvest Labor Measures, 1994 (r and p-values)

	1994 (n=50) (a) Variable Description	1	2	3	4	5	6	7	8	9	10	11	12
1	Proportion of Rice Households Using Paid												
2	Proportion of Rice Households Using	-.97 <.0001											
3	Rice Network Degree: Village Mean (b)	-.44 .0012	.43 .0018										
4	Rice Network # Reachable: Village Mean	-.39 .0056	.37 .0084	.93 <.0001									
5	Rice Network Pathlength: Village Mean	-.30 .0372	.26 .0671	.83 <.0001	.82 <.0001								
6	Rice Network Density: Village Mean	-.32 .0218	.30 .0374	.84 <.0001	.74 <.0001	.68 <.0001							
7	Rice Network Degree Centralization	-.11 .4302	.11 .4550	.55 <.0001	.35 .0125	.46 .0008	.64 <.0001						
8	Sibling Network Degree: Mean	.07 .6493	-.07 .6154	.00 .9960	.12 .4115	.07 .6414	-.17 .2281	-.28 .0502					
9	Sibling Network # Reachable: Village Mean	-.10 .4901	.09 .5460	.59 <.0001	.75 <.0001	.51 .0001	.36 .0096	.04 .7712	.48 .0004				
10	Sibling Network Pathlength: Village Mean	-.02 .8755	.00 .9791	.40 .0045	.61 <.0001	.43 .0020	.16 .2675	-.11 .4649	.62 <.0001	.92 <.0001			
11	Sibling Network Density: Mean	.12 .3950	-.14 .3347	.03 .8180	.13 .3841	.07 .6236	.11 .4320	-.12 .3878	.80 <.0001	.39 .0056	.45 .0010		
12	Sibling Network Centralization: Mean	-.09 .5509	.07 .6065	-.03 .8561	.05 .7390	-.04 .8016	.21 .1470	-.04 .8066	.33 .0179	.10 .4906	.16 .2761	.70 <.0001	

(a) One highly influential outlier removed from all village-level analyses.
(b) All Network Measures Calculated Using Symmetric Intra-Village Ties, Excludes Self-Reflexive Ties.

Appendix 1B
Full Matrix of Pearson Correlations among Village Characteristics and Rice Harvest Labor Measures, 2000 (r and p-values)

	2000 (n=51) Variable Description	1	2	3	4	5	6	7	8	9	10	11	12
1	Proportion of Rice Households Using Paid												
2	Proportion of Rice Households Using	-.97 <.0001											
3	Rice Network Degree: Village Mean (a)	-.41 .0030	.50 .0002										
4	Rice Network # Reachable: Village Mean	-.24 .0928	.32 .0222	.92 <.0001									
5	Rice Network Pathlength: Village Mean	-.11 .4631	.21 .1407	.85 <.0001	.89 <.0001								
6	Rice Network Density: Village Mean	-.25 .0759	.34 .0159	.82 <.0001	.76 <.0001	.71 <.0001							
7	Rice Network Degree Centralization	-.05 .7424	.15 .2906	.38 .0059	.22 .1183	.28 .0463	.66 <.0001						
8	Sibling Network Degree: Mean	-.07 .6132	.05 .7369	.40 .0041	.38 .0056	.32 .0211	.09 .5473	-.14 .3121					
9	Sibling Network # Reachable: Village Mean	-.05 .7149	.05 .7420	.46 .0007	.45 .0011	.35 .0107	.18 .2080	-.12 .4032	.80 <.0001				
10	Sibling Network Pathlength: Village Mean	-.06 .6851	.02 .8646	.40 .0036	.39 .0051	.29 .0411	.11 .4339	-.19 .1755	.75 <.0001	.97 <.0001			
11	Sibling Network Density: Mean	.09 .5516	-.10 .5006	.35 .0119	.35 .0118	.31 .0283	.49 .0003	.30 .0346	.67 <.0001	.51 .0001	.43 .0016		
12	Sibling Network Centralization: Mean	.13 .3667	-.11 .4485	.17 .2256	.22 .1227	.18 .1939	.46 .0006	.43 .0017	.16 .2601	.03 .8538	.00 .9968	.62 <.0001	

(a) All Network Measures Calculated Using Symmetric Intra-Village Ties, Excludes Self-Reflexive Ties.

Appendix 2A
Full Matrix of Pearson Correlations among Household-Level Network and Rice Harvest Labor Measures, 1994 (r and p-values)

	1994 (n=2007) Variable Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Household Used Extra Labor: Free/Exchange Only																
2	Household Used Extra Labor: Free/Exchange and Paid Labor	-.09 <.0001															
3	Household Used Extra Labor: Paid Only	-.90 <.0001	-.35 <.0001														
4	Household Used Extra Labor: Within Village Only	.15 <.0001	-.07 0.0032	-.12 <.0001													
5	Household Used Extra Labor: Within and Beyond Village	-.04 0.0711	.27 <.0001	-.08 0.0005	-.41 <.0001												
6	Household Used Extra Labor: Beyond Village Only	-.14 <.0001	-.10 <.0001	.17 <.0001	-.80 <.0001	-.21 <.0001											
7	Rice Network: Degree (a)	.30 <.0001	.10 <.0001	-.33 <.0001	.46 <.0001	.05 0.0283	-.52 <.0001										
8	Rice Network: Out-Degree	.31 <.0001	.11 <.0001	-.34 <.0001	.52 <.0001	.08 0.0002	-.61 <.0001	.84 <.0001									
9	Rice Network: In-Degree	.15 <.0001	.03 0.1429	-.15 <.0001	.14 <.0001	-.02 0.3284	-.14 <.0001	.71 <.0001	.20 <.0001								
10	Rice Network: Number Households Reachable by	.09 <.0001	.08 0.0007	-.12 <.0001	.23 <.0001	.02 0.35	-.26 <.0001	.47 <.0001	.43 <.0001	.29 <.0001							
11	Rice Network: Average Pathlength, (Infinite	.12 <.0001	.10 <.0001	-.15 <.0001	.56 <.0001	.15 <.0001	-.69 <.0001	.57 <.0001	.61 <.0001	.23 <.0001	.63 <.0001						
12	Sibling Network: Degree	.05 0.0333	.01 0.8229	-.05 0.0359	.13 <.0001	-.06 0.0071	-.10 <.0001	.10 <.0001	.08 0.0002	.06 0.0038	.04 0.0718	.12 <.0001					
13	Sibling Network: Out-Degree	.05 0.0236	.01 0.5322	-.05 0.0164	.12 <.0001	-.05 0.0204	-.09 <.0001	.06 0.0094	.07 0.0018	.01 0.5399	.02 0.348	.10 <.0001	.86 <.0001				
14	Sibling Network: In-Degree	.02 0.2995	-.01 0.6901	-.02 0.4225	.10 <.0001	-.05 0.0424	-.07 0.0011	.11 <.0001	.07 0.0027	.10 <.0001	.05 0.0308	.09 <.0001	.75 <.0001	.31 <.0001			
15	Sibling Network: Number Households Reachable by	.02 0.3847	.01 0.7942	-.02 0.3522	.11 <.0001	-.04 0.1102	-.10 <.0001	.07 0.0013	.07 0.0013	.04 0.1085	.05 0.0163	.14 <.0001	.64 <.0001	.66 <.0001	.33 <.0001		
16	Sibling Network: Average Pathlength, (Infinite	.05 0.0412	.02 0.4814	-.05 0.0261	.11 <.0001	-.04 0.0572	-.09 <.0001	.05 0.0271	.05 0.0265	.02 0.2797	.03 0.1909	.12 <.0001	.66 <.0001	.72 <.0001	.29 <.0001	.87 <.0001	

(a) All Network Measures Calculated Using Symmetric Intra-Village Ties, Excludes Self-Reflexive Ties.

Appendix 2B
Full Matrix of Pearson Correlations among Household-Level Network and Rice Harvest Labor Measures, 2000 (r and p-values)

	1994 (n=4081) Variable Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Household Used Extra Labor: Free/Exchange Only																
2	Household Used Extra Labor: Free/Exchange and Paid Labor	-.08 <.0001															
3	Household Used Extra Labor: Paid Only	-.83 <.0001	-.50 <.0001														
4	Household Used Extra Labor: Within Village Only	.11 <.0001	-.03 0.0995	-.08 <.0001													
5	Household Used Extra Labor: Within and Beyond Village	-.06 0.0002	.17 <.0001	-.04 0.0047	-.52 <.0001												
6	Household Used Extra Labor: Beyond Village Only	-.08 <.0001	-.11 <.0001	.13 <.0001	-.71 <.0001	-.23 <.0001											
7	Rice Network: Degree (a)	.26 <.0001	.22 <.0001	-.35 <.0001	.40 <.0001	.06 0.0001	-.51 <.0001										
8	Rice Network: Out-Degree	.24 <.0001	.25 <.0001	-.35 <.0001	.44 <.0001	.10 <.0001	-.59 <.0001	.83 <.0001									
9	Rice Network: In-Degree	.16 <.0001	.08 <.0001	-.19 <.0001	.15 <.0001	-.02 0.1881	-.15 <.0001	.72 <.0001	.22 <.0001								
10	Rice Network: Number Households Reachable by	.02 0.201	.13 <.0001	-.09 <.0001	.26 <.0001	.06 0.0001	-.34 <.0001	.51 <.0001	.58 <.0001	.17 <.0001							
11	Rice Network: Average Pathlength, (Infinite	.09 <.0001	.14 <.0001	-.16 <.0001	.48 <.0001	.15 <.0001	-.67 <.0001	.53 <.0001	.60 <.0001	.18 <.0001	.80 <.0001						
12	Sibling Network: Degree	.03 0.063	.03 0.05	-.04 0.0064	.10 <.0001	-.02 0.1315	-.10 <.0001	.16 <.0001	.13 <.0001	.11 <.0001	.07 <.0001	.09 <.0001					
13	Sibling Network: Out-Degree	.03 0.0722	.04 0.0134	-.05 0.003	.09 <.0001	-.02 0.1757	-.08 <.0001	.12 <.0001	.11 <.0001	.06 <.0001	.06 <.0001	.07 <.0001	.89 <.0001				
14	Sibling Network: In-Degree	.02 0.1735	.01 0.4671	-.02 0.1107	.09 <.0001	-.02 0.2183	-.09 <.0001	.16 <.0001	.12 <.0001	.13 <.0001	.06 <.0001	.08 <.0001	.83 <.0001	.48 <.0001			
15	Sibling Network: Number Households Reachable by	.04 0.0201	.00 0.9398	-.03 0.0479	.10 <.0001	-.05 0.0013	-.07 <.0001	.11 <.0001	.09 <.0001	.08 <.0001	.05 0.0006	.07 <.0001	.56 <.0001	.55 <.0001	.39 <.0001		
16	Sibling Network: Average Pathlength, (Infinite	.04 0.0078	.03 0.0307	-.06 0.0004	.09 <.0001	-.04 0.0189	-.07 <.0001	.10 <.0001	.08 <.0001	.07 <.0001	.05 0.0013	.07 <.0001	.61 <.0001	.63 <.0001	.38 <.0001	.88 <.0001	

(a) All Network Measures Calculated Using Symmetric Intra-Village Ties, Excludes Self-Reflexive Ties.

Appendix 3
Demography Articles Drawing Theoretical Connections between Monetization and Other Subjects, Organized by Thematic Area

I. Fertility, Marriage, and the Family

A. Demographic Transition Theory, Fertility Decline

Caldwell, John C., P. H. Reddy and Pat Caldwell. 1982. "The Causes of Demographic Change in Rural South India: A Micro Approach." *Population and Development Review* 8(4):689-727.

Caldwell, John C. and Pat Caldwell. 1978. "The Achieved Small Family: Early Fertility Transition in an African City." *Studies in Family Planning* 9(1):2-18.

Caldwell, John C. 1978. "A Theory of Fertility: From High Plateau to Destabilization." *Population and Development Review* 4(4):553577.

Cleland, John. 2001. "The Effects of Improved Survival on Fertility: A Reassessment." *Population and Development Review* 27 (Supplement):60-92.

Cleland, John and Christopher Wilson. 1987. "Demand Theories of the Fertility Transition: an Iconoclastic View." *Population Studies* 41(1):5-30.

Greenhalgh, Susan. 1988. "Fertility as Mobility: Sinic Transitions." *Population and Development Review* 14(4):629-674.

Jones, Gavin. 1990. "Fertility Transitions Among Malay Populations of Southeast Asia: Puzzles of Interpretation." *Population and Development Review* 16(3):507-537.

Mason, Karen O., Maxine Weinstein and Barbara Laslett. 1987. "The Decline of Fertility in Los Angeles, California, 1880-1900." *Population Studies* 41(3):483-499.

B. Caldwell's Wealth Flow Theory, Cost of Children

Birdsall, Nancy. 1983. "Fertility and Economic Change in Eighteenth and Nineteenth Century Europe: A Comment." *Population and Development Review* 9(1):111-123.

Caldwell, John C., Barkat-e-Khuda, Bruce Caldwell, Indrani Pieris and Pat Caldwell. 1999. "The Bangladesh Fertility Decline: An Interpretation." *Population and Development Review* 25(1):67-84.

Caldwell, John C. 1981. "The Mechanisms of Demographic Change in Historical Perspective." *Population Studies* 35(1):5-27.

Caldwell, John C. 1976. "Toward a Restatement of Demographic Transition Theory." *Population and Development Review* 2(3/4):321-366.

Fargues, Phillipe. 1997. "State Policies and the Birth Rate in Egypt: From Socialism to Liberalism." *Population and Development Review* 23(1):115-138.

Freedman, Ronald. 1979. "Theories of Fertility Decline: A Reappraisal." *Social Forces* 58(1):1-17.

Khawaja, Marwan. 2000. "The Recent Rise in Palestinian Fertility: Permanent or Transient?" *Population Studies* 54(3):331-346.

Knodel, John, Napaporn Harranon and Anthony Pamualratana. 1984. "Fertility Transition in Thailand: A Qualitative Analysis." *Population and Development Review* 10(2):297-328.

Simmons, Ruth. 1996. "Women's Lives in Transition: A Qualitative Analysis of the Fertility Decline in Bangladesh." *Studies in Family Planning* 27(5):251-268.

Stark, Oded. 1981. "The Asset Demand for Children During Agricultural Modernization." *Population and Development Review* 7(4):671-675.

C. Population Growth

McNicoll, Geoffrey. 1984. "Consequences of Rapid Population Growth: An Overview and Assessment." *Population and Development Review* 10(2):177-240.

D. Family Planning

Berelson, Bernard and Jonathan Lieberson. 1979. "Government Efforts to Influence Fertility: The Ethical Issues." *Population and Development Review* 5(4):581-613.

Frank, Odile and Geoffrey McNicoll. 1987. "An Interpretation of Fertility and Population Policy in Kenya." *Population and Development Review* 13(2):209-243.

Freedman, Ronald. 1987. "The Contribution of Social Science Research to Population Policy and Family Planning Program." *Studies in Family Planning* 18(2):57-82.

Lewis, Maureen A. 1986. "Do Contraceptive Prices Affect Demand." *Studies in Family Planning*(17):3-126.

Mita, Rezina and Ruth Simmons. 1995. "Diffusion of the Culture of Contraception: Program Effects on Young Women in Rural Bangladesh." *Studies in Family Planning* 26(1):1-13.

Schellstede, William P. and Robert L. Ciszewski. "Social Marketing of Contraceptives in Bangladesh." *Studies in Family Planning* 15(1):30-39.

Sirageldin, Ismail and Samuel Hopkins. 1972. "Family Planning Programs: An Economic Approach." *Studies in Family Planning* 3(2):17-24.

Weinreb, Alexander. 2001. "First Politics, Then Culture: Accounting for Ethnic Differences in Demographic Behavior in Kenya." *Population and Development Review* 27(3):437-467.

E. Marriage Patterns, Bridewealth, Dowries

Boomgaard, Peter. 2003. "Bridewealth and Birth Control: Low Fertility in the Indonesian Archipelago, 1500-1900." *Population and Development Review* 29(2):197-214.

Caldwell, John C., P. H. Reddy and Pat Caldwell. 1983. "The Social Component of Mortality Decline: An Investigation in South India Employing Alternatives." *Population Studies* 37(2):185-205.

Caldwell, John C., I. O. Orubuloye and Pat Caldwell. 1991. "The Destabilization of the Traditional Yoruba Sexual System." *Population and Development Review* 17(2):229-262.

Fricke, Thomas and Jay D. Teachman. 1993. "Writing the Names: Marriage Style, Living Arrangements, and First Birth Interval in a Nepali Society." *Demography* 39(2):175-188.

Mensch, Barbara S., Monica J. Grant and Ann K. Blanc. 2006. "The Changing Context of Sexual Initiation in sub-Saharan Africa." *Population and Development Review* 32(4):699-728.

F. Children as Insurance, Fertility Preferences

Axinn, William G. and Scott T. Yabiku. 2001. "Social Change, the Social Organization of Families, and Fertility Limitation." *American Journal of Sociology* 106(5):1219-1261.

Boserup, Ester. 1989. "Population, the Status of Women, and Rural Development." *Population and Development Review* 15 (Supplement)(4):45-60.

Mason, Karen O. and Anju M. Taj. 1987. "Differences between Women's and Men's Reproductive Goals in Developing Countries." *Population and Development Review* 13(4):611-638.

Montgomery, Mark R. 2000. "Perceiving Mortality Decline." *Population and Development Review* 26(4):795-819.

G. Child Care in Industrial Nations

Angrist, Shirley S. and Judith R. Lave. 1973. "Issues Surrounding Day Care." *Family Coordinator* 22(4):457-464.

H. Care for Elderly

Axinn, June and Herman Levin. 1972. "Optimizing Social Policy for Families." *Family Coordinator* 21(2):163-169.

Freedman, Ronald. 1986. "Policy Options after the Demographic Transition: The Case of Taiwan." *Population and Development Review* 12(1):77-100.

II. Mortality

A. Mortality differentials by region

Meegama, S. A. 1969. "The Decline in Maternal and Infant Mortality and its Relation to Malaria Eradication." *Population Studies* 23(2):289-302.

B. Spread of AIDS

Caldwell, John C. and Pat Caldwell. 1993. "The Nature and Limits of the sub-Saharan African AIDS Epidemic: Evidence from Geographic and Other Patterns." *Population and Development Review* 19(4):817-848.

C. Nutrition and Disease

Caldwell, John C., P. H. Reddy and Pat Caldwell. 1983. "The Social Component of Mortality Decline: An Investigation in South India Employing Alternatives." *Population Studies* 37(2):185-205.

III. Migration

A. Determinants of Migration

Arizpe, Lourdes. 1981. "The Rural Exodus in Mexico and Mexican Migration to the United States." *International Migration Review* 15(4):626-649.

Roberts, Kenneth D. 1982. "Agrarian Structure and Labor Mobility in Rural Mexico." *Population and Development Review* 8(2):299-322.

B. Consequences of Migration

Guilmoto, Christophe Z. 1998. "Institutions and Migrations: Short-Term Versus Long-Term Moves in Rural West Africa." *Population Studies* 52(1):85-103.

Haberkorn, Gerald. 1992. "Temporary versus Permanent Population Mobility in Melanesia: A Case." *International Migration Review* 26(3):806-842.

C. Remittances

Kirwan, F. X. 1981. "The Impact of Labor Migration on the Jordanian Economy." *International Migration Review* 15(4):671-695.

D. Immigrant enterprise

Waldinger, Roger. 1986. "Immigrant Enterprise: A Critique and Reformulation." *Theory and Society* 15(1/2):249-285.

E. Migrant Labor

Roberts, Kenneth D. 1997. "China's "Tidal Wave" of Migrant Labor: What Can We Learn from Mexican Undocumented Migration to the United States?" *International Migration Review* 31(2):249-293.

IV. Other Topics

A. Shifting locus of production, household production

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Appendix 4
Maximum Likelihood Heckman Selection Model of Paid Labor Use
(With Huber-White Robust Standard Errors at Village Level)

Variable	1994 Coeff	1994 StdErr	2000 Coeff	2000 StdErr
Substantive Equation: Used Paid Labor				
Potential Labor Available to Household				
Males 13-55	-0.054	0.029	-0.118 ***	0.024
Females 13-55	-0.071 **	0.027	-0.098 ***	0.026
Children under 13	-0.010	0.031	-0.024	0.028
Older members over 55	-0.095 **	0.036	-0.097 ***	0.029
Former Members	-0.046	0.088	-0.027	0.155
Remitting Migrants	0.018	0.025	0.006	0.023
Non-Remitting Migrants	-0.037	0.028	-0.036	0.022
Mean Age	0.002	0.004	-0.001	0.003
Potential Labor Requirements				
15-45 Rai of Any Land	0.283 ***	0.089	0.446 ***	0.062
45+ Rai of Any Land	0.456 ***	0.092	0.431 ***	0.097
(0-15 Rai of Any Land)				
Number of People Who Helped Plant Rice	0.061 ***	0.010	0.059 ***	0.007
Houshold Income Sources and Wealth				
Grows Cassava	-0.029	0.108	-0.029	0.073
(No Cassava)				
Cottage Industry	0.152 *	0.072	0.007	0.077
(No Cottage Industry)				
Large Livestock	0.023	0.102	0.060	0.044
(No Large Livestock)				
Makes Charcoal	-0.019	0.068	-0.022	0.054
(No Charcoal)				
Piped Water	0.138	0.074	0.054	0.053
(No Piped Water)				
Actual Windows	0.194 ***	0.050	0.180 ***	0.043
(No Windows)				
"New" Fuel	0.241	0.152	0.093	0.122
("Traditional" Fuel)				
Consumptive Assets, in 1000 Baht	0.027 ***	0.006	0.027 ***	0.004
Productive Assets, in 1000 Baht	0.002 *	0.001	0.002 **	0.001
Productive/Consumptive Assets, in 1000 Baht	0.000	0.000	0.001 ***	0.000
Non-Agricultural Wages, in 1000 Baht	0.000	0.000	0.000	0.000
Characteristics of the Village				
Village Adults 13-55, in 100s	0.000	0.000	-0.001 *	0.000
Elders ReportUsing Labor from other Villages	0.054	0.080	-0.020	0.068
Village Rice Land, in 1000 Rai	0.000	0.000	0.000	0.000
Insufficient Water	0.014	0.099	0.136 **	0.052
(Sufficient Water)				
Telephone in Village	0.107	0.080	0.058	0.062
(No Telephone in Village)				
Constant	-1.405 ***	0.278	-0.524 **	0.170

Notes: * p <= 0.05, ** p<= 0.01, *** p<=0.001

Appendix 4 (Cont'd)

Variable	1994 Coeff		1994 StdErr	2000 Coeff		2000 StdErr
Selection Equation: Grew Rice						
Potential Labor Available to Household						
Males 13-55	0.254	***	0.041	0.189	***	0.035
Females 13-55	0.148	***	0.040	0.218	***	0.035
Children under 13	-0.099	**	0.036	-0.044		0.036
Older members over 55	0.106	**	0.041	0.027		0.038
Former Members	0.247		0.166	-0.128		0.183
Remitting Migrants	-0.010		0.026	-0.016	***	0.003
Non-Remitting Migrants	-0.051		0.028	0.005		0.035
Mean Age	-0.020	***	0.004	-0.062	**	0.023
Potential to Engage in Agriculture						
15-45 Rai of Any Land	0.701	***	0.064	2.569	***	0.197
45+ Rai of Any Land	0.396	***	0.105	1.252	***	0.345
(0-15 Rai of Any Land)						
Agricultural Equipment	1.648	***	0.184	2.463	***	0.195
(No Agricultural Equipment)						
Houshold Income and Wealth						
Grows Cassava	0.266	*	0.122	0.115		0.243
(No Cassava)						
Cottage Industry	0.327	***	0.086	0.144		0.097
(No Cottage Industry)						
Large Livestock	0.798	***	0.051	0.449	***	0.068
(No Large Livestock)						
Makes Charcoal	0.360	***	0.059	0.475	***	0.057
(No Charcoal)						
Piped Water	0.092		0.099	0.028		0.070
(No Piped Water)						
Actual Windows	-0.056		0.066	-0.087		0.067
(No Windows)						
"New" Fuel	-0.300	*	0.135	-0.238	*	0.098
("Traditional" Fuel)						
Consumptive Assets, in 1000 Baht	-0.026	***	0.005	-0.008		0.006
Productive Assets, in 1000 Baht	-0.003	*	0.002	-0.003	***	0.001
Productive/Consumptive Assets, in 1000 Baht	-0.001	***	0.000	-0.001	***	0.000
Non-Agricultural Wages, in 1000 Baht	0.000	*	0.000	0.000		0.000
Characteristics of the Village						
Village Rice Land, in 1000 Rai	0.000		0.000	0.000		0.000
Insufficient Water	-0.294	*	0.117	-0.014		0.097
(Sufficient Water)						
Village Telephone	-0.081		0.133	-0.127		0.084
(No Village Telephone)						
Constant	0.717	**	0.239	0.122		0.197
Model Characteristics:						
N Obs	5109			6920		
Censored Obs	944			1641		
Uncensored Obs	4165			5279		
Overall Model Wald $\chi 2$	285.72	***		393.26	***	
Inverse hyperbolic Tangent of ρ	-0.077	ns	0.289	0.087	ns	0.115
Wald $\chi 2$ Test of Equation Independence	0	ns		1	ns	

Notes: * p <= 0.05, ** p<= 0.01, *** p<=0.001

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