LABOR MARKET OUTCOMES OF INDIVIDUALS IN RECOVERY FROM ADDICTION TO ALCOHOL

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A dissertation submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of Economics.

Chapel Hill
2013

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ABSTRACT

ARNIE PAUL ALDRIDGE: Labor Market Outcomes of Individuals in Recovery from Addiction to Alcohol
(Under the direction of Donna B. Gilleskie)

The majority of the cost burden of Alcohol Use Disorders (AUDs) is due to alcohol's adverse impact on the labor market in the form of lost wages for those not employed and decreased productivity for those employed. In this study, I develop a model of employment, drinking, and treatment-seeking that is based on an economic model of individual behavior. The model is estimated using longitudinal data on individuals from COMBINE, a National Institute of Alcoholism and Alcohol Abuse and Drug Abuse (NIAAA) randomized control trial of two pharmacotherapies and a cognitive behavioral intervention for dependence. The first aim of this study is to estimate the causal effects of AUD outcomes on employment over a three-year period following the COMBINE trial. The second aim is to estimate the effects of employment outcomes on subsequent drinking. The third aim is to evaluate the role of ongoing therapy for AUDs. To this end, I develop a dynamic model that attempts to control for time varying and permanent individual heterogeneity and uses an identification strategy to reduce any bias from the endogenous relationships across these outcomes. Within this framework, I also evaluate several policy experiments related to the price of consumption goods and treatment as well as policies around treatment dosage. The results indicate that drinking behavior during treatment (in this case, the COMBINE trial) have large and lasting effects on subsequent drinking, though the effects stabilize over the long term. Full time employment over 90% of the period leads to a slight increase in problem drinking. A ten

percent increase in gasoline prices leads to a 3.6 percentage points increase in the probability of abstinence (p=.003). A simulated experiment of doubling the prescription period for pharmacotherapy has an unequivocally positive effect on drinking outcomes. Here, abstinence increases by 4.6 percentage points (p<.001) and problem drinking >50% of the period (PDH) decreased by 2.6 pp (p=.005). These results improve our understanding of how trials for treatment of alcohol use disorders can be evaluated, particularly to understand how changes in alcohol consumption translate into employment outcomes and then used to inform policy decisions.

ACKNOWLEDGEMENTS

I would like to thank my wonderful wife and children for their patience and support. I would like to thank my committee and advisor for their patience and guidance. Special thanks go to Michael Darden, Bert Grider, Denise Whalen, and many others in the UNC Applied Microeconomics Seminar for their helpful comments and moral support. Partial funding for this work was provided by a Professional Development Award from RTI, International and a grant from the National Institute on Alcohol Abuse and Alcoholism.

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LIST OF ABBREVIATIONS

AA	Alcoholics Anonymous
ACCRA	American Chamber of Commerce Research Association
AUD	Alcohol Use Disorders
C2ER	Council for Community and Economic Research
CBI	Cognitive behavioral intervention
COMBINE	Combined Pharmacotherapies and Behavioral Interventions for Alcohol Dependence
DFRE	Discrete factor random effects
DSM-IV	*Diagnostic and Statistical Manual of Mental Disorders, 4th Edition*
FDA	Food and Drug Administration
IC	Initial condition
MH	Mental health
MSA	Metropolitan Statistical Area
NCAIS	North American Industry Classification System
NHIS	National Health Interview Survey
NIAAA	National Institue of Alcoholism and Alcohol Abuse and Drug Abuse
NPD	Non-Problem Drinking
NSDUH	National Survey on Drug Use and Health
N-SSATS	National Survey of Substance Abuse Treatment Services

OPC	Outpatient Counseling
PDL	Problem Drinking <50% of Period
PDH	Problem Drinking >50% of Period
Q-F	Quantity and frequency
RA	Rational addiction
RCT	Randomized Controlled Trial
RxT	Pharmacotherapy
SAMHSA	Substance Abuse and Mental Health Services Administration
SH	Self-help
SSRI	Serotonin re-uptake inhibitors

CHAPTER I. INTRODUCTION

By the 21st century, 8.46% of adults in the United States met clinical criteria for alcohol abuse (4.65% or 9.7 million adults) or alcohol dependence (3.81% or 7.9 million adults) (Grant et al., 2004). Alcohol Use Disorders (AUDs), including abuse and dependence, impose significant costs on society, estimated at $230 billion in 2009 (Rehm, 2009; Harwood, 2000; Mokdad, 2004). The majority of the cost burden (60%) is due to alcohol's adverse impact on the labor market in the form of lost wages for those not employed and decreased productivity for those employed. It has been shown that alcohol abuse (MacDonald and Shields, 2004, Feng et al., 2001; Mullahy and Sindelar, 1996) and dependence (Johannson et al., 2007) are associated with unemployment and labor market detachment. AUDs are associated with lost productivity (Cook and Moore, 1999; Mullahy and Sindelar, 1998) and lower earnings (Keng and Huffman, 2002; Jones and Richmond, 2006; Zarkin et al., 1998). Understanding the causal relationships between alcohol and labor market performance is valuable for constructing alcohol use, prevention, and treatment policies.

Literature on the connection between AUDs and labor market outcomes broadly fits into two categories. The first looks at how outcomes differ between populations with and without AUDs. Public health and economic research has sufficiently shown the deleterious effects of AUDs. Econometric studies in particular have been valuable in refining the estimates of these effects by addressing several common confounders: reverse causality and unobserved characteristics that simultaneously influence drinking

and labor market success.[1] The value of this literature is that it has identified AUDs as a measurable problem and has broadly described its costs to individuals and society.

The literature, however, has several limitations. Most studies are based on a snapshot of current substance use and labor market outcomes, ignoring how changes in both behaviors evolve over time and how the compositions of the AUD and non-AUD samples change (MacDonald, 2004).[2] Economic decision making has a direct bearing on how the costs of substance abuse are determined, and understanding that behavior directly informs policy (Caulkins and Nicosia, 2010). Finally, it does not incorporate the role of AUD treatment in changing the composition of the AUD and non-AUD populations that are compared in static cross-sections.

The second type of literature broadly focuses on the efficacy and effectiveness of prevention and treatment of AUDs (Room et al., 2007). These studies are generally based on clinical trials of interventions and specialty treatment and evaluations of programs or policies that directly provide treatment, reduce barriers to treatment, or create disincentives for alcohol consumption. Labor market outcomes are usually analyzed as secondary outcomes in these studies. These studies are limited in their understanding of how improvements in AUDs lead to labor market outcomes and how those labor market outcomes recursively influence AUDs (e.g., psychosocial benefits of employment as a protective factor or work stress). Often, they are simply limited by the period of time over

[1] These studies do not always compare two discrete populations, those with and those without AUDs, but estimate local average treatment effects and implicitly compare populations with marginally different AUDs.

[2] Johannson (2006) shows, for example, that currently abstinent, previously dependent drinkers often have poor enough outcomes that comparisons between abstainers and moderate drinkers yields biased results.

which they follow participants and do not allow sufficient time for improvements in labor market outcomes. Moreover, studies of specialty treatment often ignore the extent to which participants seek additional or future treatment beyond the original study. Yet, additional or repeated treatment is considered appropriate and is often based on attained employment which provides insurance or financial accessibility (CSAT, 2004).

In the study, I develop a model of employment, drinking, and treatment-seeking that is based on an economic model of individual behavior. The model is estimated using longitudinal data on individuals from a National Institute of Alcoholism and Alcohol Abuse and Drug Abuse (NIAAA) randomized control trial of two pharmacotherapies and a cognitive behavioral intervention (CBI) for dependence called Combined Pharmacotherapies and Behavioral Interventions for Alcohol Dependence (COMBINE). The first aim of this study is to estimate the causal effects of AUD outcomes on employment over a three-year period following the COMBINE trial. The second aim is to estimate the effects of employment outcomes on subsequent drinking. The third aim is to evaluate the role of ongoing therapy for AUDs. To this end, I develop a dynamic model that attempts to control for time varying and permanent heterogeneity and uses an identification strategy to reduce any bias from the endogenous relationships of these outcomes. Within this framework, I also evaluate several policy experiments related to the price of consumption goods and treatment as well as policies around treatment dosage.

The remainder of this manuscript contains a more in depth discussion on the background and literature of employment, alcohol and treatment modeling (Chapter 2), a theoretical model (Chapter 3), a description of the sample used for estimation (Chapter

4), and an empirical model (Chapter 5). Chapter 6 provides results and Chapter 7 concludes the manuscript with a discussion of the findings.

CHAPTER II. BACKGROUND AND LITERATURE

Alcohol Abuse and Alcohol Dependence

Understanding what is meant by different AUDs is necessary for interpreting the literature on alcohol use and related outcomes. Moreover, the specific measures of AUDs can have different theoretical relationships with outcomes being studied. The *Diagnostic and Statistical Manual of Mental Disorders*, currently in its fourth edition (DSM-IV), provides clinical criteria for diagnosing alcohol abuse and alcohol dependence. Although various levels and patterns of alcohol consumption can be detected through biological screening (e.g., urine tests detect increased liver enzymes), DSM-IV clinical determinations are based on self-reported information. Indications of alcohol abuse are based on perceptions of drinking's secondary effects: does the individual feel that alcohol caused problems at home, work, or school; led to dangerous behaviors; or led to criminal justice interactions. In addition, if the individual reports the inability to reduce consumption despite the perception of alcohol's consequences he qualifies as abusing.

The DSM-IV defines dependence with a focus on consumption patterns, drinking's primary consequences, and the individual's relationship with alcohol. A positive diagnosis of dependence is typically made when a clinician identifies three or more of the following:

(1) Spent a great deal of time over a period of a month getting, using, or getting over the effects of alcohol;

(2) Used alcohol more often than intended or was unable to keep set limits on alcohol use;

(3) Needed to use alcohol more than before to get desired effects or noticed that same amount of alcohol use had less effect than before;

(4) Inability to cut down or stop using alcohol every time tried or wanted to;

(5) Continued to use alcohol even though it was causing problems with emotions, nerves, mental health, or physical problems;

(6) Alcohol use reduced or eliminated involvement or participation in important activities; *and* has experienced two or more withdrawal symptoms during the same time period:

(7) Reported experiencing two or more alcohol withdrawal symptoms at the same time that lasted longer than a day after alcohol use was cut back or stopped. Symptoms include (i) sweating or feeling that heart was beating fast, (ii) having hands tremble, (iii) having trouble sleeping, (iv) vomiting or feeling nausea[ted], (v) seeing, hearing, or feeling things that were not really there, (vi) feeling like could not sit still, (vii) feeling anxious, and (viii) having seizures or fits.[3]

It is important to recognize that abuse and dependence are psychological constructs that categorize a degree of severity in drinking behaviors, drinking consequences, and an individual's relationship to drinking. AUDs represent a measurement problem described originally in psychological research in which a latent construct (e.g., dependence) is not observed but can be defined by how it manifests itself in behavior, consequences, and perceptions. AUDs are uniquely challenging to define because they are dynamic. Over time, individuals may cycle in and out of different levels of severity, even returning to abstinence. These observed cycles are not a reflection of the reliability of clinical testing

[3] Diagnosis criteria come from the National Survey on Drug Use and Health's version of the DSM-IV criteria.

but are in evidence when measured by self-reported consumption patterns, clinical interviews, and biological screening (McLellan, 2007).

A special challenge for researchers is determining which measurement is useful for analysis. Consumption levels are correlated with the severity of a disorder as defined by the other criteria but their inconsistency has implications for some research questions. Clinical interviews have the advantage of evaluating an individual's ongoing struggle with an AUD (e.g., strong cravings to drink or a fixation on alcohol) that may not be manifested through current consumption alone. For example, a currently abstinent individual may still have a latent disorder that is reducing his functioning or altering his preferences. In the first case, cross-sectional analyses of drinking and labor market outcomes would only represent the direct impact of drinking and the impact of disorders only for current drinkers. Altered preferences largely explain such phenomena as continued treatment seeking by abstainers as well as their avoidance of certain social environments (e.g., weddings with open bars). Longitudinal observation of consumption resolves these challenges to some extent while also providing more specificity (i.e., timing, lagged consumption patterns) than discrete clinical diagnoses.

In addition to the DSM-IV diagnosis criteria and in response to the public health burden of moderately risky drinking, researchers have also developed screening instruments to detect both finer levels of less risky drinking while remaining sensitive enough to detect severe problems with minimal respondent information.[4] Most screeners ask about an individual's average alcohol consumption in standardized drinking units, usually the quantity of drinking in an episode and the frequency of episodes during a set

[4] For example, the Alcohol Use Disorders Identification Test (AUDIT) is designed to detect a continuum of risky use levels and the four question CAGE (Cut-down, Annoyed, Guilty, Eye-opener) is designed to detect dependence.

time period. They also ask about perceptions of drinking and related consequences. Although consumption measures seem crude, they tend to be strong indicators of non-consumption criteria. In fact, there is an emphasis among public health and clinical researchers to move to a core quantity and frequency (Q-F) measure to more quickly screen individuals (Saitz, 2005; Gastfriend et al., 2007; McLellan, 2007). These instruments and Q-F measures are prevalent in many large observational studies and have been used to estimate the relationship of drinking with secondary outcomes. Again, the use of reported consumption is often more appropriate in models of alcohol's causal impact, since the alternative constructed measures described above often include the measures of the dependent variables being analyzed (e.g., absences from work).

Following from these different measures of drinking disorders, terms like 'risky', 'problem', 'harmful' or 'hazardous' drinking are used in different studies and are sometimes used interchangeably with 'abuse'. In the remainder of this literature review, I use the exact measures that the authors used and clarify their meanings when necessary. In the theoretical model described in Chapter 3, AUD is a continuous variable representing the severity of an individual's drinking disorder. In Chapter 4, I describe the primary measure of drinking that I use in my empirical model.

Employment and Drinking

AUDs are associated with labor market outcomes along multiple causal pathways. Both acute alcohol abuse, such as binge drinking, and longer term dependence can reduce an individual's work productivity through reductions in human capital, health, and motivation (Cook and Moore, 1999; Mullahy and Sindelar, 1998; Corrao et al., 2004). They likewise decrease the intensity of job searching through the same mechanisms.

Even if real productivity decreases are not realized, such drinking behaviors can serve as a negative signal to current and prospective employers. These adverse effects accumulate over time with increasing productivity loss and a growing portfolio of negative signals that can include sporadic labor market attachment and a reputation of low productivity.

AUDs may be associated with labor market outcomes through the individual's preferences. An abusive or dependent drinker may value leisure differently because of worse health or a complementarity of drinking and leisure (Mello and Mendelson, 1972). He may discount time differently or have a different attitude toward risk, relative to the general labor market population either due to pre-existing characteristics or due to neurological changes brought on by drinking [Dom et al., 2005; Moselly et al., 2001; Tavares et al., 2004]. Therefore, he may leave the labor market more often and for longer periods of time. He may choose to work part time which may have later consequences for his earnings profile and employment probabilities. Alternatively, the deleterious effects of AUDs on health may provide more incentive for an individual to remain with an employer who provides health insurance.

Identifying causal pathways is further complicated by the fact that an individual's labor market experience also influences drinking behaviors. Employment produces an income effect on all consumption, potentially increasing drinking. There may likewise be an income and insurance effect on drinking that operates through expectations about treatment for AUDs. Individuals anticipating sufficient income or insurance coverage for specialty treatment may increase their current drinking (ex ante moral hazard). Both employment and unemployment can induce stress that is associated with AUDs (Frone, 1999; Gallo et al., 2001). Employment may provide a social network that facilitates and

encourages drinking. Finally, employment may provide protective factors that reduce the prevalence of AUDs. These include social norms that encourage safe drinking, wellness programs, and easier access to treatment through employer provided insurance and Employee Assistance Programs.

In this study, I focus on employment as the primary labor market outcome for several reasons. Employment is the broadest measure of labor market value and subsumes labor supply. For individuals currently in the labor market, real wages do not change much over a several-year time horizon. On the other hand, choosing to seek employment and finding employment are both outcomes with substantial variation over the study period.

Most of the estimated effects of AUDs on employment found in the economics literature rely on large, cross-sectional datasets. Specifically, these studies explain the different rates of employment between individuals with and without AUDs among an observed population.[5] The fundamental econometric challenge in these studies is estimating the causal effects of AUDs in the face of a simultaneity problem or when unobserved heterogeneity is likely to explain both the AUD and labor market success. The standard approach in these studies is to use instrumental variables (IV) that predict an individual's AUD but are theoretically and empirically uncorrelated with labor market outcomes other than through the AUD. With data from the National Health Interview Survey (NHIS), Mullahy and Sindelar (1996) used parental AUDs and beer and cigarette taxes as instruments of dependence, abuse and harmful drinking. MacDonald and Shields (2004) used non-acute illnesses that might limit drinking (e.g., asthma and diabetes) as

[5] A similar approach is seen in the literature on wages and labor supply as summarized in Jones (2006) and Johansson et al (2007).

instruments of dependence in the 2000 National Health Survey of England. Johansson et al. (2007), using Finland's Health 2000 survey, utilized parental characteristics, asthma and diabetes, religiosity, a person smoking behavior at the age of 18, and medical biomarkers as instruments of dependence. All of these studies found significant and large effects of abuse and dependence on employment. Several found a positive relationship between moderate levels of drinking and employment.

One study (Feng et al., 2001) used a repeated cross-sectional dataset to estimate the effect of problem drinking on employment. Problem drinking was defined by combinations of lifetime DSM-IV criteria and drinking behaviors during the previous 12 months. Employment was defined as any employment during the same 12 months. With data from the Epidemiological Catchment Areas of six southern US states, they estimated bivariate probit models of the contemporary effect of problem drinking on employment. When using county alcohol sales policies as instruments this study found no negative consequences of problem drinking on employment and argued that the effects of problem drinking on employment may occur over a long period of time.

While these studies have been useful in demonstrating reasonable estimates of the employment consequences of having an AUD, they exhibit a common limitation in cross-sectional studies. They provide only the estimated effect of recently having an AUD on current employment, when both the AUD and employment outcomes are the results of a long series of prior decisions. Abuse and addiction have complex dynamic paths over time within individuals. This limitation presents several challenges to interpreting results and to making alcohol policy. It is uncertain what proportion of the population 'without a recent AUD' has experienced one in the past. Without knowing how long the negative

employment consequences of an AUD last, we cannot know to what degree we may be underestimating the effect of having an AUD. Moreover, without understanding the causal mechanisms, we do not know whether we should expect prevention or treatment policies to have any short or long term labor market benefits. The only panel study of the AUD-employment relationship highlights this problem by offering the explanation that there may be a delay in employment consequences of problem drinking.

Treatment for Alcohol Use Disorders

In 2010, the number of persons aged 12 or older needing treatment for an alcohol use problem was 18.5 million (7.3 percent of the population aged 12 or older). Of these, 1.6 million (0.6 percent of the total population and 8.5 percent of the people who needed treatment for an alcohol use problem) received alcohol use treatment at a specialty facility. Thus, there were 17.0 million people who needed but did not receive treatment at a specialty facility for an alcohol use problem. Among the 17.0 million people aged 12 or older who needed but did not receive treatment for an alcohol use problem in 2010, there were 698,000 (4.1 percent) who felt they needed treatment for their alcohol use problem. Of these, 485,000 did not make an effort to get treatment, and 213,000 made an effort but were unable to get treatment in 2010 due to lack of health coverage/cost of treatment, and/or lack of transportation (NSDUH, 2010).

Background on different types of treatment provides useful context for the treatment options and outcomes that this study analyzes. The sample of individuals I study are engaged in treatment and meet certain AUD and other criteria. Overall, they are high-functioning, e.g., engaged in the labor market, and do not represent the most severe AUDs. They consume little inpatient and residential treatment and have little

criminal involvement. More detail on the sample is provided in Chapter 4. The three treatment options that I focus on are self-help (SH), outpatient counseling (OPC) and pharmacotherapy (RxT) which represent the majority of treatment sought by study individuals in the US. They also represent the most common treatment consumed by substance use treatment seekers in the US with 54% attending a SH group and 42% receiving OPC during a 12 month period (NSDUH, 2008). More importantly, these three modalities are of interest because of the way in which they fit lifestyles. The time and monetary costs of these are low relative to inpatient and residential treatment. Individuals can continue working, living in their own residence and otherwise functioning 'normally' while consuming these. Increasingly, an individual can seek OPC or RxT starting with their primary care physician and can avoid the stigma associated with traditional treatment. Along the continuum of AUD severity, there is a role for any of these. Even for the most severe AUDs, ongoing use of SH, outpatient and RxT should be considered following other more intensive therapies. Finally, their flexibility and relatively low costs make them ideal subjects for public health policy.

This chapter also provides the clinical basis for how treatment fits in the theoretical model presented in Chapter 2, including the justification of modeling treatment as a stock. I describe the dynamics of treatment and the recovery. The chapter ends with the economic theory of treatment demand.

Defining Recovery

Although abstinence has traditionally been a goal of specialty treatment, researchers on treatment effectiveness have placed new emphasis on reductions in harmful drinking episodes, recognizing that a steady state of moderate drinking can be

the goal of individuals seeking treatment (McLellan, 2004). Overall, specialty treatment for alcohol is effective with some studies finding more than half of recipients remaining abstinent by the end of the observation period (CSAT, 2004; Room et al., 2005; Project Match Research Group, 1997). Although many studies use length of time to relapse as an outcome, relapsing to problem drinking does not mean that the recovery process has ended and returning to treatment is not a bad outcome. Initial abstinence is a good predictor of long term healthy behaviors (Maisto et al., 2006; McKay and Weiss, 2001) including the maintenance of safe or controlled levels of drinking after treatment (McLellan, 2004; Gastfriend et al., 2007).

For an individual with a more severe AUD, 'recovery' is often defined by more than an episode of abstinence or controlled drinking. As noted earlier, consumption is useful for measuring outcomes over the limited periods of observation that studies face. However, clinicians, patients and researchers recognize that recovery is not simply an end state in which a 'disease' has been 'cured'.[6] Rather, language such as 'in recovery' is more commonly used to refer to ongoing success with an acknowledgement of the potential for relapse. Moreover, successful recovery is better conceived of as a steady state in which not only consumption is controlled but the latent factors that motivate problematic consumption are also alleviated or managed. These factors include antecedent individual characteristics such as genetics and socioeconomic environment that led to the initial AUD. Manifestations of these are risk- or sensation-seeking personalities, depression, anxiety and other psychiatric disorders, social acceptability of excessive drinking, social norms regarding leisure activities, and limited opportunities for healthy or fulfilling activities are all risk factors for AUDs that may remain in place even

[6] Note for instance the "Disease" model of addiction that is implicitly used by Alcoholics Anonymous.

after initial treatment has led to abstinence or controlled consumption. Dynamic factors brought on by past consumption also challenge the recovery process. These include changes in brain structure that alter decision-making faculties and alter preferences for alcohol and other goods and activities; development of mental illness; habits; and socioeconomic circumstances such as reduced human capital or a primary social group that is centered on alcohol. The broader goal of treatment is therefore to facilitate a steady state of recovery by managing these factors in addition to managing consumption.

Traditional Specialty Treatment and Self-Help

Conventional forms of specialty treatment vary by the severity of the AUD and most types of treatment may be considered part of a continuum of care that ideally helps an individual improve from his current AUD to steady state recovery. The intensity of treatment in the continuum is intended to match the severity of the AUD and decreases as an individual improves. The intensity is loosely correlated with consumption level, due in part to the biological nature of severe physical addiction. The most intensive care associated with AUDs a period of detoxification in which a patient is sequestered, monitored and medicated for safety and management of withdrawal symptoms. Inpatient is traditionally 28 days and nights of treatment in a facility that offers a range of services, including RxT and counseling.

Along the continuum of care, residential treatment, day treatment and outpatient therapy follow inpatient treatment with group and individual sessions occurring 1 to 7 times per week. Inpatient and OPC usually rely on motivational enhancement therapy, 12-step facilitation treatment, cognitive behavioral treatment and behavioral family counseling, and contingency management and community reinforcement approaches or some combination of these. Each of these approaches share similar elements. They encourage goal setting and the

development of self-efficacy through 'practicing' sobriety. They also encourage proactive restructuring of an individual's lifestyle. These include changes to work and social environments as well as developing alternative leisure activities. An individual is also encouraged to simultaneously treat mental or physical illness. Each approach seeks to change motivations by changing perceived social norms and reiterating the consequences of consumption, promoting positive social reinforcement and accountability (either from the family, a mentor or the clinician) and highlighting the positive value gained from alternative activities. They teach mechanisms for coping with stress and temptation, which include pre-commitment strategies (e.g., requesting hotel rooms without mini-bars) and contemporaneous coping strategies (e.g., cognitive tools for overcoming periods of temptation) (Moos 2007; Project Match Research Group, 1997).

Self-help groups, e.g., Alcoholics Anonymous (AA), are similar to OPC in several ways. Although they mostly employ some version of 12-step facilitation, the two modalities share many active ingredients as described in the preceding paragraph. Frequency of sessions can be much higher for SH groups than for OPC, especially since they are virtually free. The culture of the therapy is the largest difference. SH groups are almost entirely composed of other individuals who are in recovery themselves (Peers) and usually have no formal clinical training. Despite some professional antagonism between SH organizations and clinical counselors, SH is often encouraged as a complement to formal specialty treatment or an alternative when an individual does not have the desire or means.

Pharmacotherapy for Alcohol Use Disorders

Pharmacotherapies are often prescribed in conjunction with inpatient treatment and OPC. Moreover, some of these medications are increasingly prescribed by primary care physicians for individuals with varying AUD severity and who may not otherwise be engaged in specialty substance abuse treatment. The medications commonly associated with AUDs typically fall into three categories: medications that alleviate withdrawal symptoms, medications that enhance overall mental health (MH), and medications that support recovery by directly influencing an individual's preferences for drinking (Williams, 2005). The last group is the focus of this study. Medications for withdrawal are prescribed for a short period of time to reduce the mental and physical effects of sharp reductions in alcohol consumption. The broadest class used is benzodiazepines which have anxiolytic and anticonvulsant properties. It should be noted that the availability of medically facilitated detoxification and medications to make withdrawal less unpleasant can have a perverse effect on long run recovery as it reduces the disincentives to relapse and escalation of consumption. Moderate and severe MH problems are commonly co-occurring with AUDs, with anxiety and moderate depression having the highest prevalence at all degrees of AUD severity. Regardless of the causal relationship between AUDs and MH, treating MH is expected to facilitate recovery indirectly by improving the individual's overall wellbeing, his ability to cope, and by reducing the 'pain' of poor MH that leads to self-medication with alcohol. In other words, the intent is for these medications to be pharmacological analogues to many of the proximal outcomes of the counseling therapies described above. Selective Serotonin Re-uptake Inhibitors (SSRIs) and benzodiazepines (for longer run anxiety rather than detoxification) are among the most commonly prescribed medications to individuals with AUDs or who are in recovery

(Berglund et al., 2006; Grant et al., 2004; Sher, 2004; Watkins et al., 2006). Their use is complicated by contraindications with drinking and, in the case of benzodiazepines, the specific concern of exposing individuals to new addictive substance. There is ample evidence that individuals seek these medications regardless of any intent to alter their alcohol consumption and that primary care physicians prescribe them without knowledge of an existing AUD. Because of this confounding and substantial use in the COMBINE sample, use of antidepressants, principally SSRIs, is included as a treatment consumption choice separate from other alcohol-specific treatments.

Medications in the third category are intended to support recovery directly and are usually prescribed specifically for the AUD. They theoretically aid recovery by reducing cravings, preventing compulsive relapse, or causing nausea or discomfort from drinking. There are currently three US Food and Drug Administration (FDA)-approved medications for relapse prevention during recovery from alcohol dependence: Disulfiram (Antabuse), Naltrexone and Acamprosate. As post-withdrawal pharmacotherapies, they function in a similar fashion as some of the counseling strategies. Disulfiram, which causes nausea and discomfort if alcohol is also consumed, is a pre-commitment device. The two drugs studied in the COMBINE trial, Naltrexone and Acamprosate, both normalize brain functioning by affecting neurotransmitters that may be unregulated due to chronic alcohol consumption. They both reduce alcohol cravings. Naltrexone's mechanism of action is dopaminergic, improving impulse control, reducing the intensity of cravings and reducing the pleasure of alcohol. Naltrexone has been found to reduce the amount of alcohol consumed in a single setting with patients noting a reduced desire to drink to excess. Acamprosate's mechanism of action is not yet understood although it operates through the glutamate and gamma-

aminobutyric acid (GABA) system. Acamprosate does not alter the effects of consumed alcohol. Acamprosate is the newest of the three drugs and was approved by the FDA in 2005. Several additional medications with similar pharmacology are either currently being studied for efficacy in managing drinking or are known to be prescribed off-label. These include quetiapine, topiramate, gabapentin, levetiracetam, baclofen, tiapride, bromocriptine and aripiprazole. Because certain benzodiazepines are γ-aminobutyric acid (GABA)ergic there is ongoing interest in their use as a longer run RxT for alcohol dependence despite the challenges described above (Bankole, 2005). Finally, serotonergic medications continue to be studied explicitly for treating alcoholism. There is some evidence that SSRIs are effective for controlling alcohol consumption especially for late-onset dependents. However, there is conflicting evidence as to whether the reduced preference for alcohol observed is due to a general effect on consumption and satiety with respect to food and liquids or a selective effect on alcohol. Moreover, there is little evidence that SSRIs are more beneficial for individuals with co-morbid depression than placebo in reducing alcohol abuse. Ondansetron is a serotonin antagonist (rather than an SSRI) with growing evidence of efficacy for drinking outcomes and also reported reductions in the cravings for alcohol and enjoyment of drinking.

Naltrexone, Acamprosate and this latter group of medications can have a proximal effect on alcohol consumption-both the decision to engage in drinking and the intensity of drinking. There is no set recommendation for how long Naltrexone and Acamprosate should be prescribed. The COMBINE trial dispensed medications for 4 months, while some clinicians have recommended 6-12 months (Fatemi and Clayton, 2008). Disulfiram is usually prescribed for shorter periods. For all of them, there is an understanding that additional prescriptions may be necessary as boosters, similar to traditional counseling. The

longer run influence on recovery is expected to operate indirectly. Short run reductions in consumption allow the brain and physiological adaptations of addiction to heal and normalize. While on the medications, lifestyle changes and habit formation may occur more easily and individuals may develop coping strategies. Their influence can function in a way dissimilar to counseling therapy alone. While on the medications, an individual may be able to manage his drinking while not altering his lifestyle, an often infeasible challenge. He can thus be reconditioned to not drink in response to the cues and routines of daily life.

Economic Models of Treatment for Alcohol Use Disorders

Any attempt to model an individual's drinking, and treatment decisions must recognize that they are not made in ignorance of future consequences. An individual knows that abusive drinking can lead to near term and long term productivity loss, labor market challenges, poorer health and, most importantly, to severe dependence, a proclivity for continuing abuse or withdrawal effects. The latter consequence, that individuals know that drinking today influences the value of drinking later, is a key component of Becker and Murphy (1988)'s rational addiction (RA) framework for modeling substance use. This framework is a useful starting place for analyzing drinking choices jointly with other economic choices. Drinking decisions today may be influenced by expectations about productivity losses, employment probabilities and health. Moreover, individuals may recognize that consuming specialty treatment for AUDs can be an effective tool for moderating their drinking and its ultimate consequences.

Theorists have expanded the original RA model in an attempt to make it better explain observed substance use and, to a limited extent, treatment seeking behaviors. The

original theory did not explicitly make the case for treatment seeking. Orphanides and Zervos (1996) provided a rationale for a posterior demand for treatment, after an individual discovered if they were an addictive personality type. Analogous justifications come from present-biased preferences (Gruber and Koszegi, 2001) and "projection bias" (Lowenstein, 1999) in which individuals assume that their current and future preferences will be similar. Several observed phenomena were still lacking theoretical justification, including relapse to AUDs, ongoing treatment seeking even after achieving abstinence, the tendency for some individuals' convergence to moderate drinking patterns rather than abstinence. Bernheim and Rangel (2004), building on Laibson (2001), incorporate the neuroscience on substance use behavior into a traditional RA framework. A key component is that individuals can find themselves seemingly randomly in a 'hot' mental state in which their instantaneous marginal utility of a substance leads to behavioral 'mistakes' and a reduction in total lifetime utility. The 'hot' states are brought on by environmental cues that trigger brain mechanisms that are manifested as a compulsive desire to consume the substance. In the Bernheim and Rangel model, individuals in recovery manage this challenge in part by choosing safe environments in which the flow of cues is reduced. The most extreme example of this behavior is checking into a residential treatment facility. A second role of treatment that their model recognizes is learning to deal with cues, a common objective of most counseling therapy. Although they do not discuss RxT, it can be justified in a similar way as counseling.

In the traditional RA framework, treatment has primarily been presented as an investment in future outcomes at the expense of current utility from leisure and alternative consumption. Some forms of treatment may provide their own per se utility,

e.g., through social interactions or self-empowerment. As described above, treatment may alter the immediate marginal utility of drinking or time preferences (Yoon et al., 2007). It may similarly alter the experience of and thus preferences for leisure and other consumption. For example, Naltrexone has been reported to reduce the enjoyment of shopping. Gul and Pesendorfer (2007) provide an alternative model of addiction that subsumes these latter effects of treatment on utility. In their framework, utility is a function of both actual consumption and the individual's remaining choice set. Although this framework somewhat ignores how treatment alters the utility of all other consumption and leisure, it clearly justifies including treatment as an input to current utility.

In summary, recent theoretical literature has developed models of the demand for treatment that fit better with observed data. They are consistent with several stylized facts and with findings in the clinical literature: individuals vary in their substance use patterns. The behaviors of some individuals are consistent over long periods of time, while others are dynamic, cycling through dependence, moderation, and abstinence. Individuals seek treatment all along the continuum between dependence and abstinence. Almost all of the models of addiction are underidentified by available data. Nonetheless, the economic models are consistent in their implication that under certain assumptions individuals may seek treatment.[7]

The policy relevance of studying treatment is threefold. First, there are externalities from AUDs, including decreased employment and lost productivity, accidents, public health care costs, and crime. Second, the existing treatment system is largely a public system. Given that some individuals are willing to seek treatment, it is

[7] For this study, I ignore legally mandated treatment.

worthwhile to study the relative effectiveness of different portfolios of treatment to inform policies that promote treatment. Interest in RxT is particularly high because it is a passive and convenient form of treatment that can be prescribed by primary care physicians which reduces the overall stigma of receiving treatment (Bankole, 2005).[8] Finally, as synopsized by Bernheim and Rangel (2004) individuals may suffer from unanticipated compulsion to consume sub-optimally (internalities). Studying the effectiveness of alternative treatments is worthwhile for improving their welfare.

[8] Nonetheless, it is recommended that pharmacotherapy be combined with traditional counseling therapy.

CHAPTER III. THEORETICAL MOTIVATION

In this section I present a dynamic, theoretical model of the behavior of individuals who have had an AUD and who have previously sought formal specialty treatment for the AUD. Chapter 4 will provide greater detail concerning the study sample, but two characteristics of the data provide useful context for the theoretical model. First, each time period in the data is roughly four calendar months which is the time between data collection interviews. Second, at the time of the interview, questions about employment, outpatient counseling and self-help sessions are reported as totals for the entire period, whereas drinking and pharmacotherapy to manage drinking and depression are reported for each day within the period. The model focuses on their employment, drinking, ongoing AUD treatment decisions and the use of antidepressants.

In each period t, an individual maximizes his remaining lifetime expected utility by choosing per-period hours of general leisure, l_t, levels of alcohol consumption, a_t, types of therapy to manage drinking and the AUD (including no therapy), m_t, whether or not to consume antidepressants, s_t, and amount of consumption, c_t. He begins each period with a set of state variables accounting for his previous decisions and experiences: work history prior to the current period, Q_t; drinking history, A_t; past treatment choices, M_t; past antidepressant use, S_t; and, D_t, the current level of severity of his AUD. A positive drinking history (A_t) does not have a direct negative effect on utility but

influences the marginal utilities of the choice variables in the immediate period. The individual receives negative utility from experiencing any level of AUD (D_t), which can be conceptualized as the subjective disutility of having a high addictive stock, negative psychic consequences of alcohol abuse, or guilt and frustration over drinking behaviors. An individual's work, alcohol use, treatment, and antidepressant stocks at the beginning of period t are functions of the respective stocks at the beginning of the previous period and his employment, alcohol use, AUD treatment, and antidepressant use in period t-1

His AUD, D_t, is a function of all his current-state variables, particularly drinking history (A_t), and the previous level of AUD, D_{t-1},

$$D_t = D(D_{t-1}, A_t, M_t, S_t, \delta^D) \quad (1)$$

D_t may also influence the marginal utilities of the choice variables.

The marginal utility of drinking (a_t) is conditional on the current treatment consumption (m_t) which reduces the marginal utility of alcohol; drinking history (A_t), a standard feature in rational addiction models; previous treatment that forms a stock of capacity to moderate drinking (M_t); past antidepressant use (S_t); and the current severity of the AUD (D_t). Thus past drinking (A_t) affects the current drinking choice through the typical addiction/habit formation mechanism as well as indirectly through the AUD for which an individual may drink to cope or relieve the psychic distress.

The vector Z_t includes observable local environmental characteristics such as wages by sector, prices, and local treatment capacity. X_t is a vector of observable individual characteristics and μ represents permanent individual differences. ν_t is an

unobserved time varying factor and $\varepsilon_{i,t}$ is the idiosyncratic error. For notational ease in the utility function, *i* subscripts for individual are left out of the model. Also, let K_t be the vector of all the state endogenous variables: $(Q_t, A_t, M_t, S_t, D_t)$.

At each time period t, the individual selects l_t, a_t, m_t, s_t, and c_t to maximize expected discounted utility realizing that in the future the individual will make the optimal choice given the realized values of the random variables, with *T* being the last period of the individual's life.

$$\mathrm{E}_t\Big[\sum_{t=1}^{T} \beta^{t-1}[U(a_t, l_t, m_t, s_t, c_t; K_t, X_t, Z_t, \mu, \nu_t, \varepsilon_t)]\Big] \tag{2}$$

subject to a maximum number of hours (3), four laws of motion (4-7), a production function for the AUD severity (8), a budget constraint that does not include borrowing (8), and a wage offer (10):

$$\Omega - l_t = h_t \tag{3}$$

$$Q_t = Q(l_{t-1}, Q_{t-1}, \delta^Q) \tag{4}$$

$$A_t = A(a_{t-1}, A_{t-1}, \delta^A) \tag{5}$$

$$M_t = M(m_{t-1}, M_{t-1}, \delta^M) \tag{6}$$

$$S_t = S(s_{t-1}, S_{t-1}, \delta^S) \tag{7}$$

$$D_t = D(D_{t-1}, A_t, M_t, S_{t,}\delta^D) \tag{8}$$

$$p_{a,t} * a_t + p_{m,t} * m_t + p_{s,t} * s_t + c_t = w_t*(h_t) + N_t \tag{9}$$

$$w_t = w(K_t, X_t, Z_t) \tag{10}$$

The variable β is a constant discount factor. Ω is the maximum hours available to the individual in each time period. The δ^j in equations 4-8 are depreciation rates for their respective state variables. $p_{a,t}$, $p_{m,t,}$ and $p_{s,t}$ are the prices of alcohol, AUD treatment and antidepressants, respectively. w_t is the individual's wage if working, and N_t is any non-labor income. U_t is a concave function of current drinking, leisure, treatment, antidepressant use and other consumption. For a large range of drinking levels, U_t is an increasing function of a_t, though it is possible that the marginal effect of alcohol eventually becomes negative. Assuming that utility is an increasing, concave function of a_t, the signs of the partial derivatives are

$$\frac{\partial U(a_t, l_t, m_t, s_t, c_t; K_t, D_t, X_t, Z_t, \mu, \nu_t, \varepsilon_t)}{\partial a_t} \geq 0; \tag{11}$$

$$\frac{\partial^2 U(a_t, l_t, m_t, s_t, c_t; K_t, D_t, X_t, Z_t, \mu, \nu_t, \varepsilon_t)}{\partial a_t^{\,2}} \leq 0 \tag{12}$$

$$\forall a_t, l_t, m_t, s_t, c_t, K_t, D_t, X_t, Z_t, \mu, \nu_t, \varepsilon_t$$

All of the state variables are increasing functions of their respective past outcomes and they depreciate. Consistent with the standard rational addiction framework, current drinking (a_t) influences the marginal utility of future drinking via an increment in the state variable A_{t+1} used in the following period. AUD severity, D_t, is a function of past AUD severity, as well as the drinking, treatment, and antidepressant use history state variables.

By assumption, an individual's marginal utility of alcohol consumption increases with the drinking history state variable (A_t):

$$\frac{\partial^2 U(a_t, l_t, m_t, s_t, c_t; K_t, D_t, X_t, Z_t, \mu, \nu_t, \varepsilon_t)}{\partial A_t \partial a_t} \geq 0 \tag{13}$$

$$\forall a_t, l_t, m_t, s_t, c_t, K_t, D_t, X_t, Z_t, \mu, \nu_t, \varepsilon_t$$

and decreases with past treatment (M_t):

$$\frac{\partial^2 U(a_t, l_t, m_t, s_t, c_t; K_t, D_t, X_t, Z_t, \mu, \nu_t, \varepsilon_t)}{\partial M_t \partial a_t} \leq 0 \tag{14}$$

The drinking component of the model is consistent with Becker and Murphy's (BM) rational addiction theory of substance use in that preferences are conditional on an individual's previous alcohol consumption. The model allows the individual to influence the optimal value of future drinking through current drinking and current consumption of treatment. Specifically, current treatment reduces the marginal utility of future drinking, conditional on the drinking history state variable. Thus, the individual uses current treatment to manage the tradeoff between the future utility from drinking and the future disutility of the AUD. Antidepressant use enters the utility function similar to alcohol-specific treatment and decreases the marginal utility of alcohol, though the theoretical mechanism are not entirely the same. As described in Chapter II, antidepressants may be a substitute for alcohol in improving mood (alleviating underlying psychic distress) and they may reduce compulsive behavior. Because many SSRIs are contraindicated by alcohol, their use acts an additional constraint (regardless of whether an individual recognizes their use as a type of pre-commitment).

In the BM model, the motivation to reduce consumption is based primarily on the secondary consequences of chronically high levels of drinking such as health, productivity, crime, or changes in the price of alcohol. By emphasizing the per se disutility of having an AUD, the model diverges from BM conceptually but is not inconsistent in its general predictions. The labor market is the only consequence that I explicitly include in the model and is described below. As noted earlier, I am allowing current treatment to directly enter an individual's utility function.

Clinical treatment, self-help, and pharmacotherapy as well as antidepressant use are special cases of the general effort spent to reduce drinking introduced by BM. In this model I ignore any non-formal treatment for three reasons. First, I do not observe any informal efforts. Second, all of the study subjects have engaged in formal treatment at some point in their lives. Almost all formal treatment has some component of therapy that teaches individuals behaviors and habits to help them control their drinking and prevent relapse. All treatment requires a component of personal effort and encourages ongoing personal effort.[9] Therefore, it becomes difficult to disentangle pure personal effort from any ongoing treatment effect. Finally, because consumption of formal treatment, and especially pharmacotherapy, can be more easily encouraged by policy-makers, estimates of its effect are of greater interest.

As described in Chapter 2, the Becker and Murphy and Orphanides and Zervos rational addiction frameworks do not by themselves predict several observed drinking and treatment seeking behaviors, especially over shorter periods of time. The models of Bernheim and Rangel and Gul and Pesendorfer offer better face validity; however, neither

[9] Arguably, all personal effort after treatment is more productive because of the 'technology' acquired in treatment.

would significantly change the empirical model that I describe in Chapter 5 and that is supported by the data. Finally, this model does not explicitly include any learning or Bayesian updating by an individual concerning his addiction or treatment efficacy.

Timing[10]

At the beginning of each period, *t*, the individual has complete information about his past and also about his current market environment:

- past behaviors (Q_t, A_t, M_t, S_t),
- the current severity of the AUD (D_t),
- current preferences which are influenced by past behaviors and a random preference shock,
- current prices for alcohol, treatment, antidepressants, and consumption goods (Z_t),
- a current wage offer , w_t, (including no offer) which is also a function of the state variables.

[10] I considered as alternative theoretical model in which individuals choose employment at the beginning of a period which remains fixed throughout the remainder of the period. All alcohol and other consumption during the period would be chosen conditional on the employment decision. Employment framed as a period-long commitment would be chosen in response to current wage offers and state variables but also with the knowledge of the within-period prices and preferences for consumption. The empirical advantage of this model is that it allowed estimation of the one-way contemporaneous effects of employment on drinking and other consumption. Though this model is theoretically viable, it requires a very strong assumption about the timing of decisions and the nature of employment 'commitments'. Some employment decisions are literally contractual commitments. Moreover, on any given day, an individual may intend to remain employed for the foreseeable future. However, labor supply is just as easily characterized as a daily decision, especially when made jointly with drinking which has a complementarity with leisure and, especially among this population, is associated with short term consequences for labor supply (e.g., productivity shocks or absences due to adverse health event or accidents. The identification strategy to validate and use such a model required exogenous predictors of employment (at the beginning of a period) that were excludable from the within period decisions. Within the general framework I describe in Chapter 6, I estimated models in which market wages were used to predict per-period employment but were excluded from all other per-period equations. This identification strategy was not statistically supported. I have focused instead on the simpler framework of simultaneous determination of all per-period choices which does not require the strong assumption about the timing of employment decisions.

The values of the state variables, current preferences (after the preference shock is known), prices and the wage offer remain constant throughout the entire period. During the period, he simultaneously chooses employment status, how much to drink, how much AUD treatment to consume, antidepressant use, and other consumption. At the end of the period, state variables are updated based on those decisions.

The individual knows that the decisions made during the current period affect future preferences, particularly the future marginal utility of alcohol, through his state variables. He also knows that current decisions will affect future productivity, the probabilities of receiving future wage offers, the distribution of future wage offers, and the severity of the AUD in the future. The individual's per-period decision making can be described by the following value function framework. Recall that K_t is the vector of state variables which represent four laws of motion for employment, drinking, AUD treatment decisions and the use of antidepressants (Equations 4-7) and the AUD severity.

In the final period T of an individual's life, consumption is chosen to maximize current utility with no consideration of future periods.

$$V(K_T, \nu_T, \varepsilon_T) = \max_{a_T, l_T, m_T, s_T, c_T} U(a_T, l_T, m_T, s_T, c_T; K_T, X_T, Z_T, \mu, \nu_T, \varepsilon_T) \quad (15)$$

In each period $t<T$, conditional on state variables (K_t) and the period t specific shocks, the individual makes consumption choices that maximize the sum of current utility and the expected future value (integrating over the future error terms) conditional on how those consumption choices change K_{t+1}.

$$V(K_t, \nu_t, \varepsilon_t) = \max_{a_t, l_t, m_t, s_t, c_t} \begin{bmatrix} U(a_t, l_t, m_t, s_t, c_t; K_t, X_t, Z_t, \mu, \nu_t, \varepsilon_t) \\ + E_{\nu_{t+1}, \varepsilon_{t+1}} [\beta V(K_{t+1}, \nu_{t+1}, \varepsilon_{t+1})] \end{bmatrix} \quad (16)$$

$$s.t. \quad K_{t+1} = K(a_t, l_t, m_t, s_t, c_t; K_t) \quad \forall\, t < T$$

Since the per-period choices are made jointly, they are all functions of the same set of state variables, prices and community-level characteristics, individual characteristics and heterogeneity. In each period, the employment decision (leisure demand), and demand for alcohol, AUD therapies, and antidepressants are

$$e_t = e(Q_t, A_t, M_t, S_t, D_t, Z_t, X_t, \mu, \nu_t) \quad (17)$$

$$a_t = a(Q_t, A_t, M_t, S_t, D_t, Z_t, X_t, \mu, \nu_t) \quad (18)$$

$$m_t = m(Q_t, A_t, M_t, S_t, D_t, Z_t, X_t, \mu, \nu_t) \quad (19)$$

$$s_t = s(Q_t, A_t, M_t, S_t, D_t, Z_t, X_t, \mu, \nu_t) \quad (20)$$

Wages unconditional on employment are functions of the same variables except Z_t^w only includes market wages and excludes prices for consumption goods contained in Z_t. X_t^w excludes non-labor income.

$$w_t = w(Q_t, A_t, M_t, S_t, D_t, Z_t^w, X_t^w, \mu, \nu_t \mid h_t > 0) \quad (21)$$

CHAPTER IV. DATA

COMBINE Study Sample

The COMBINE trial randomized 1,383 adult participants to nine different combinations of two pharmacotherapies (Acamprosate and Naltrexone) and a CBI. The trial also included Medication Management for all but one group that received no pills or placebos. Randomization took place within eleven different treatment sites in the United States between 2001 and 2003 (Medical University of South Carolina, Boston Consortium, University of Washington, University of Texas, Brown University, University of Miami, University of New Mexico, Yale University, University of Pennsylvania, Harvard University, University of Wisconsin). Trial treatment lasted for sixteen weeks after which the individuals' only interaction with trial staff was incentivized follow-up data collection. Data collection continued at four-month intervals for three years after randomization for a subset of willing participants whose data were collected for an economic study of COMBINE. Nine of the original eleven sites chose to continue data collection for the economic study.

The main inclusion criterion for the study was a DSM-IV diagnosis of alcohol dependence. Participants were excluded if another substance was deemed to be the primary drug of dependence, had a severe psychiatric illness or had certain serious physical conditions (COMBINE Protocol). Other inclusion criteria were that "participants must have been drinking a minimum of > 14 drinks (females) or > 21 drinks (males) on average per week over a consecutive 30-day period in the 90-day period prior to initiation of abstinence,

and have two or more days of heavy drinking (defined as 4 drinks for females and 5 drinks for males) in the 90-day period prior to initiation of abstinence. Participants must have had a minimum of 4 consecutive days (96 hours) of abstinence. Participants can be abstinent for a maximum of 21 days prior to randomization." Participants were also excluded if they intended to engage in any other treatment for alcohol-related problems during the 16 week study period, if they had used one of the study medications in the past 30 days or if they had had inpatient substance use treatment in the past 30 days.

In this study I focus on outcomes *following* the end of the 16 week trial for several reasons. Participation in a clinical trial artificially influences outcomes due to inclusion/exclusion criteria, time commitments and frequent interactions with clinical staff. The study required up to four visits per month to the research site during the trial treatment. Second, I am using the trial's randomization of individuals to treatment arms as an identification strategy for the initial drinking and treatment conditions. Participation in the trial represents a reset of many individuals' drinking profiles and also initiates them to different experiences with RxT.

Appendix Table A.1 describes the sample size and observations of the original COMBINE study. Of the 991 participants who completed 16 weeks of treatment in the nine sites that continued the study, 792 chose to participate in the three-year economic study and completed 6,138 interviews including an interview at randomization and at the end of 16 weeks of trial treatment. Attrition within this group was limited.[11] Moreover, there were relatively few missing interviews because the data collection instruments were

[11] The reasons for the low attrition rate include the frequency of follow-up interviews, incentives, the rapport established between the study participants and the study staff during the main study period, and the amount of grant resources provided to the study sites to support data collection. Finally, the participants eligible for the follow-up study had successfully completed 16 weeks of study treatment and thus may have been selected on unobserved characteristics that were correlated with study participation.

designed to capture outcomes *since the previous interview*. The clinical staff conducting the interviews were trained in techniques to improve recollection (COMBINE Protocol). In accordance with the original study, if too much time passed between interviews, the clinical staff attempted to reconstruct the outcomes as of the time of the missed interview. Although this approach to data collection increases the likelihood of recall bias, it has the advantage of removing intermittent missing information. Fortunately, less than 6% of interviews occurred outside of 60 days of the intended interview date. Finally, there was virtually no non-response to any particular question in the primary data collection instrument other than logical survey skips. The current analysis sample is 775 individuals with 4,994 post trial interviews after removing 17 individuals with a large number of inconsistent or missing observations or individuals with fewer than four of the eight possible follow-up interviews. Of these, 601 interviews were flagged as having been reconstructed. Appendix Table A.2 provides definitions for key model covariates.

One of the strengths of this study is the quality of its measures. The data were collected using the Economic Form 90 instrument (Bray et al., 2007) which asked about labor market outcomes, substance use and MH treatment seeking and health since the last interview. All treatment information collected by the Form 90 refers to self reported treatment seeking and is unrelated to COMBINE study treatment. The Form 90 also collected detailed daily alcohol use in standard drinking units using a calendar follow-back method which is considered an accurate survey method for certain types of substance use. Finally, a concomitant medications file recorded daily use of over-the-counter and prescription medications of participants as well as the reason for the use. The length of the time since the previous interview averages four months. This relatively short

interval time is useful because it not only supports a longitudinal and dynamic statistical model but it also supports a theory-driven statistical model that depends on simultaneous alcohol consumption and treatment decisions. In other words, it supports modeling the key behaviors that theory would predict. No other survey contains such detailed measures of treatment use, substance use, and employment outcomes over such fine periods of time.

Appendix Table A.3 describes the characteristics of the 775 individuals in the analysis sample. Marital status and education variables are both mutually exclusive categorical variables. Of note, this sample is fairly well educated with fewer than 7% not having achieved a high school degree or better, and over 40% having a college degree or higher. Marital status and education are only collected at the beginning of the trial, therefore I do not observe any changes over time.

Appendix Table A.4 provides detail on the main measures of employment. These employment categories were based on two questions from the Form-90: the number of weeks worked since the previous data collection interview and the typical number of hours worked per week. Although the Form 90 asks about current employment status, I chose to use the measures that represent the employment experience over the entire period up to the interview rather than a snapshot at the end of the reporting period. Current employment or unemployment is a less comprehensive outcome than the extent to which an individual actually worked during the time before the snapshot of status. From the individual's perspective increased labor market success (conditional on wanting to work) due to improved AUD outcomes is a net positive. From a particular societal perspective any increase in employment is considered a positive outcome, regardless of

whether it happened due to improvements in job search success or due to a stronger preference or capacity to supply labor. In the COMBINE sample, 96% (not reported in Appendix Table A.4) report either being employed or looking for employment in at least one time period. In any period a little over half of the sample is employed full-time for almost the whole period and another 12-13% are employed part-time for most of the period. The final three columns provide evidence of the variation in employment status over the three years of the study. Post-trial 75% of the sample was employed full-time for >90% of the period at least once. Thirty-three percent of the sample did not work at all during at least one period of reporting. Alternatively, only 40% of the sample did not change employment status. The largest group that remained the same was full-time for >90% of the period at 29%, followed by 8% who did not work the entire time. Although not reported in the table, over half of those claimed to have looked for work during at least one period. These facts are consistent with the inclusion/exclusion criteria which admitted a relatively high functioning group of individuals with AUDs.

Alcohol consumption was recorded in US standard drinking units (14 grams of alcohol) for each day during the look-back period. From these daily amounts I define a *problem drinking week* as either a week with at least one heavy drinking day (4+ drinks for women, 5+ drinks for men) or a week of overall high consumption (14+ drinks for men or women). As described in Chapter 2, for someone in recovery, a heavy drinking day is usually considered a relapse. Similarly, it is possible for someone to drink at hazardous levels without necessarily exceeding the heavy drinking threshold within a single day. Therefore, I use both of these measures to define a general episode of problematic drinking. Appendix Table A.5 reports four drinking outcomes for a given

period. The first is no drinking at all; the second is moderate or controlled drinking in which alcohol is consumed, but no problem weeks are reported. Among those who reported any problem weeks, I divide the group into those for whom less than half of the period was consumed of problem weeks and those who reported more than half of the period as problem weeks. Because of the inclusion criteria of the study, everyone in the sample was in a problem drinking category at Period 1. During the period of treatment, 21% of the sample remained abstinent with most individuals having problem weeks more than half of the period (36.9%). This latter category increased to 44.0% in Period 3, eight months after study treatment ended. Over time, the number of individuals reporting abstinence increases to 35.3% in Period 9, while the number of patients with any problem drinking decreases. Although some of this is due to sample attrition, some of it is due to recognized patterns of natural and treatment-supported recovery. The final column of Appendix Table A.5 demonstrates the drinking dynamics within individuals with 47.9% reporting at least one period of abstinence and 63.4% reporting at least one period of problem drinking greater than half the period.

The Form-90 asked the number of visits to alcohol SH groups during the previous period including AA and other groups. Similarly, the Form-90 asked for the number of visits for outpatient treatment to help reduce or control drinking. I currently only include a period as a period in which SH was consumed if the individual attended more than 7 visits. Likewise, I only include a period as a period in which outpatient treatment was consumed if the individual attended more than 3 sessions during the period. The first reason for these decisions was that ensure a meaningful dose of each treatment modality and these levels reveal a more than passive engagement in treatment seeking. The second

reason is supported by the observed data. For example, 46 SH observations were eliminated of which 37 were periods in which only one SH visit was reported. Similarly, for RxT, I included only periods in which more than 14 days of RxT were consumed. This amount ensured that the effects of any of the medications could have been in place based on known titration levels. Moreover, because there is evidence that individuals often choose to consume pharmacotherapies for discrete time periods either in response to AUD concerns or in anticipation of circumstances or events. This is most common with Disulfiram, but is also true for Naltrexone. Sixteen observations were not included as RxT, of which all had less than five days of consumption.

Since all of these modalities can be consumed simultaneously, I constructed a categorical variable that is reported in Appendix Table A.6. Because cell sizes were small for some combinations, the categorical variable was reduced to four categories: No treatment, SH only, OPC or OPC + SH, and RxT alone or in combination with OPC and/or SH. The non-mutually exclusive outcomes for each of the three treatment modalities are also reported in Appendix Table A.6. SH was the most common treatment before and after the trial. In the periods after treatment, 38.5% of individuals had at least one period with SH consumption, followed by 28.3% for OPC and 18.2% for RxT. When including the trial treatment, 66.2% of individuals consumed OPC and 70.3% consumed RxT (only including non-placebo pill use). Following study treatment, about 86% of the sample experienced at least one period in which they consumed no treatment. Appendix Table A.7 shows the same outcomes for antidepressant use. Twenty-three percent of the sample used an antidepressant during at least one period following the Trial.

Appendix Table A.8 presents transition probabilities for each of the dependent variables to further demonstrate variability over time. For employment, full-period full-time employment was the most persistent category with 84.5% remaining in this category across Periods 3-9. For alcohol, abstinence was the most persistent with 81.3% remaining abstinent if they were abstinent in the previous period. Very few individuals go from problem drinking (>50% of the period) to abstinence or moderate drinking in a single period. Similarly, only 3.8% of moderate drinking periods are followed by problem drinking (>50% of the period). Periods with no treatment are usually followed by periods with no treatment (89.6%).

Mood disorders such as moderate depression and anxiety are common among individuals with AUDs and such moderate MH problems were not part of COMBINE's exclusion criteria. Study participants reported prescription and non-prescription medication use in a Concomitant Medication interview that was administered alongside the Form 90. Because of the possibly substantial role in AUD recovery, I extracted all SSRIs, tri-cyclic antidepressants and any other medication which an individual claimed was prescribed (even if off-label) for depression. Although SSRIs are not strictly prescribed for depression (anxiety disorders being the next most common rationale), I counted all SSRIs as antidepressants. Of SSRI users, 73% of the sample listed depression as the primary reason for the prescription. Of the remaining 27%, slightly less than half claimed anxiety and depression. Even if depression is not listed as the primary reason, SSRIs have a high probability of influencing moods. If an individual possessed any of these medications on more than 45 days in a period (larger than the titration and initial efficacy period) then I coded them as using an antidepressant that period.

Secondary Data

Prices for beer and several other consumption goods are gathered from the American Chamber of Commerce Research Association (ACCRA) cost of living index dataset. Since 1968, volunteers from the Council for Community and Economic Research (C2ER) have recorded the local prices for specific brands, makes, and sizes of different products, which are then used to create this index. During the years used in our analysis (2000 to 2007 to include lag prices), the number of markets reporting prices in each quarter range from 274 to 321 markets. All real prices are calculated using the U.S. Bureau of Labor Statistics Consumer Price Index for all urban consumers, all items index for regions. These prices can be merged on for each quarter and metropolitan area reported within the study sample. I only used beer prices because the way wine prices were collected changed during the study period. Likewise, liquor prices were not collected after 2004. I also include the price for a gallon of gas, average home price, and the price of a visit to a primary care physician.

Average sector wages come from the Quarterly Economic Census of Wages collected by the Bureau of Labor Statistics. I include wages for retail, construction, and manufacturing sectors according to the North American Industry Classification System (NAICS). These data are merged onto my sample at the quarterly, Metropolitan Statistical Area (MSA) level.

Data on the formal specialty treatment landscape in any given community is available from the Substance Abuse and Mental Health Services Administration (SAMHSA) via the National Survey of Substance Abuse Treatment Services (N-SSATS). This is a census of outpatient, inpatient, and residential treatment providers. I use the ratio of utilized outpatient slots, calculated as the number of total outpatient counts during the 12-month reporting year across all providers divided by the total regular capacity of outpatient slots. Also, I use the

proportion of providers who have a sliding scale fee structure and the interaction of these two variables. Finally, I divide these variables by annual, statewide number of individuals who either needed or received treatment for alcohol abuse or dependence provided by the National Survey on Drug Use and Health (NSDUH). These data are merged at the community and year level.

Prices for medications are drawn from Medicaid fee-for-service drug claim data for each state and quarter (Centers for Medicare and Medicaid Services, 2007). The representative price for antidepressants is for a 20-mg pill (most common dosage in the COMBINE sample) of Fluoxetine (Prozac) the most commonly recorded antidepressant in the COMBINE sample. Fluoxetine was also the first blockbuster SSRI in the US and it became generic in 2001 providing a large price drop during the COMBINE enrollment period. I use Naltrexone (50mg) prices to represent RxT for alcohol. Although Disulfiram is the most well-known medication in general, COMBINE participants were familiar with Naltrexone and Naltrexone was consumed 6 times as often as Disulfiram following the trial. Acamprosate did not become available in the US until 2005 and only 9 individuals used it outside of the trial itself. I use 30-day supply prices for both medications.

Appendix Table A.9 reports means and standard deviations for the time-varying individual and community-level variables used in estimation. Appendix Table A.9 also reports state-level and local-level variables described above, including exclusion restrictions for the initial condition (IC) equations which are described in Chapter 5.

CHAPTER V. EMPIRICAL MODEL

In this chapter, I define the empirical approach I use to estimate the dynamic relationships among the employment, drinking, AUD treatment choices, and antidepressant use among the COMBINE sample based on the theoretical model described in Chapter 3. In addition, I estimate a per-period model of log wages conditional on being employed. I begin by describing the specifications for these per-period equations. First, I define how state variables (lagged endogenous outcomes) are calculated and evolve over time. I describe the exogenous prices and other environmental variables that enter each equation and individual-level covariates. Next, I describe the discrete factor random effects method which I use to jointly estimate these equations while incorporating permanent and time-varying unobserved heterogeneity. Finally, I describe the identification strategy for the endogenous right-hand side variables which includes reduced form estimation of initial conditions.

I define Q_t, employment history, as a vector of three different measures of outcomes accumulated up to the current period: the number of periods *employed <90% of the period*, the number of periods *employed part time >90% of the period*, and the number of periods *employed full time >90% of the period*. I define drinking history A_t to be a vector of different drinking measures that capture different consumption patterns up to the current period. These include total number of periods of *non-problem* drinking and the two levels of *problem drinking*. I define M_t as the number of periods since the last time an AUD treatment *[SH only, OPC (no RxT) and any RxT]* was chosen. If an AUD

treatment was chosen in the previous period, then its respective state variable assumes a value of zero. S_t is the total number of periods of *antidepressant use* to period t. AUD severity is not observed is not explicitly included in the empirical model. Thus, in addition to representing addictive stock, past drinking behaviors, A_t, is also a key proxy for AUD severity (along with unobserved heterogeneity and the remaining state variables). The vector Z_t contains quarterly local (county) wages for construction and manufacturing sectors, prices for beer, gas, housing, naltrexone, and fluoxetine at period t. Also included are local specialty substance use treatment system variables by year. They are counts of unused OPC sessions. Then, I divide them by the number of people receiving or claiming to need specialty treatment for AUDS according to NSDUH state and year estimates. I also separately count the unused OPC sessions which were available to patients who need a sliding scale fee. Finally, I include self-reported travel times to treatment or other medical facilities. The vector X_t contains individual characteristics of gender, age, education, and non-labor income.

Estimation Strategy

I estimate the five main equations jointly using the discrete factor random effects model (DFRE), a flexible random effects estimation technique (Heckman and Singer, 1984; Mroz and Guilkey, 1992; Mroz, 1999). In DFRE, an individual's time varying and time invariant unobserved heterogeneity enters each equation and are correlated across across all equations. Specifically,

$$
\begin{aligned}
\varepsilon_{1,t} &= \mu_1^e + \upsilon_{1t}^e + e_{1t}^e \quad e = 0,1,2,3 \\
\varepsilon_{2,t} &= \mu_2^a + \upsilon_{2t}^a + e_{2t}^a \quad a = 0,1,2,3 \\
\varepsilon_{3,t} &= \mu_3^m + \upsilon_{3t}^m + e_{3t}^m \quad m = 0,1,2,3 \\
\varepsilon_{4,t} &= \mu_4^s + \upsilon_{4t}^s + e_{4t}^s \quad s = 0,1 \\
\varepsilon_{5,t} &= \mu_5 + \upsilon_{5t} + e_{5t}
\end{aligned}
\tag{22}
$$

where the μ_j are permanent unobserved individual heterogeneity, υ_{jt} are individual time varying heterogeneity and the e_{jt} are the idiosyncratic errors.

As described in Chapter 4, the employment outcome in each period, e_t=e is defined by four mutually exclusive categories e, e=0,1,2,3.

$$
e = \begin{cases}
0 \text{ if not employed at all during the period} \\
1 \text{ if employed but for less than 90\% of the period} \\
2 \text{ if employed the entire period, } < 35 \text{ hours per week} \\
3 \text{ if employed the entire period, } >= 35 \text{ hours per week}
\end{cases}
\tag{23}
$$

As explained in Chapter 3 theory suggests that the employment outcome depends on the history of all choice variables and exogenous policy variables that affect the jointly made decisions.[12] It also depends on preferences for consumption and the prices of consumption.

Assuming that the $e_{1,t}^e$ in Equation 18 are additively separable, mutually independent, and Type-I Extreme Value distributed error terms, the log odds ratio of e_t = *e* relative to the outcome $e_t = 0$, conditional on $\mu_1^e + \upsilon_{1t}^e$ is.

[12] As mentioned in the Chapter 3, a previous version of my model separated the employment and consumption decisions within each period. Assuming an individual committed to period-long employment in the beginning of a period created the opportunity to estimate the effect of employment status on drinking and other outcomes during the period. The identification strategy to support this was to include exogenous market wages in the employment equation but exclude them from the within period outcome equations. However, wages were weak instruments for employment and the strategy was not found to be viable.

$$\ln\left[\frac{\Pr(e_t = e)}{\Pr(e_t = 0)} \mid \mu_1^e, \upsilon_{1t}^e\right] = \\ \delta_0^{1,e} + \delta_1^{1,e} Q_t + \delta_2^{1,e} A_t + \delta_3^{1,e} M_t + \delta_4^{1,e} S_t + \\ \delta_5^{1,e} Z_t + \delta_6^{1,e} X_t + \mu_1^e + \upsilon_{1t}^e \quad \forall e = 1,2,3; \forall t = 2,...,T \tag{24}$$

yielding a multinominal logit estimation specification.

Similarly, the alcohol consumption choice

$$a_t = \begin{cases} 0 \text{ if abstinent} \\ 1 \text{ if non - problem drinking only} \\ 2 \text{ if problem drinking, less than 50\% of period} \\ 3 \text{ if problem drinking, more than 50\% of period} \end{cases} \tag{25}$$

jointly depends on the same set of theoretically relevant variables as employment. The multinomial logit model of engaging in each type of drinking behavior conditional on μ_2^a and υ_{2t}^a is

$$\ln\left[\frac{\Pr(a_t = a)}{\Pr(a_t = 0)} \mid \mu_2^a, \upsilon_{2t}^a\right] = \\ \delta_0^{2,a} + \delta_1^{2,a} Q_t + \delta_2^{2,a} A_t + \delta_3^{2,a} M_t + \delta_4^{2,a} S_t + \\ \delta_5^{2,a} Z_t + \delta_6^{2,a} X_t + \mu_2^a + \upsilon_{2t}^a \quad \forall a = 1,2,3; \forall t = 2,...,T \tag{26}$$

In accordance with the theoretical framework, current drinking is a function of past employment (Q_t), past drinking (A_t) a proxy for addictive stock and AUD severity, and previous treatment (M_t), which has ongoing behavioral effects independent of the stock of drinking. Drinking is dependent on prices and the current wage if employed. In addition, employment has an effect on drinking independent of the wage. Employment's effect subsumes several possible effects that cannot be separately observed or identified.

Employment might be a protective factor as a relatively safe, cue-free environment. It might shift preferences for drinking by increasing self-esteem and reducing general anxiety about livelihood. Alternatively, employment could increase preferences for drinking to relieve stress.

AUD treatment can be one of four mutually exclusive categories, *m*, where

$$m = \begin{cases} 0 \text{ if no treament modality is consumed} \\ 1 \text{ if only SH visits consumed} \\ 2 \text{ if OP only or OP + SH visits are consumed} \\ 3 \text{ if Any Rx for alcohol is consumed} \end{cases} \tag{27}$$

During the period, the individual chooses to consume treatment to alter the long run preferences for drinking.

Similar to alcohol and employment, the log odds of each treatment choice is

$$\begin{aligned} &\ln\left[\frac{\Pr(m_t = m)}{\Pr(m_t = 0)} \mid \mu_3^m, \upsilon_{3t}^m\right] = \\ &\delta_0^{3,\mathrm{m}} + \delta_1^{3,\mathrm{m}} Q_t + \delta_2^{3,\mathrm{m}} A_t + \delta_3^{3,\mathrm{m}} M_t + \delta_4^{3,\mathrm{m}} S_t + \\ &\delta_5^{3,\mathrm{m}} Z_t + \delta_6^{3,\mathrm{m}} X_t + \mu_3^m + \upsilon_{3t}^m \quad \forall m = 1,2,3\,; \forall t = 2,\ldots,T \end{aligned} \tag{28}$$

The logit model for whether antidepressants are consumed is

$$\begin{aligned} &\ln\left[\frac{\Pr(s_t = 1)}{\Pr(s_t = 0)} \mid \mu_4^s, \upsilon_{4t}^s\right] = \\ &\delta_0^{4,s} + \delta_1^{4,s} Q_t + \delta_2^{4,s} A_t + \delta_3^{4,s} M_t + \delta_4^{4,s} S_t + \delta_5^{4,s} Z_t + \delta_6^{4,s} X_t + \mu_s^s + \upsilon_{4t}^s \quad \forall t = 2,\ldots,T \end{aligned} \tag{29}$$

Finally, the per-period log wage is treated as a continuous variable but does not use the same specification as all other per-period outcomes. The distribution of wages offered in the labor market is a function of an individual's human capital (including all their state variables and other characteristics) and of industry wages. Z_t^w includes these wages and excludes prices for consumption goods contained in Z_t. X_t^w excludes non-labor income.

$$\begin{aligned}&\log wage_t \mid \mu_5, \upsilon_{5t} = \\ &\delta_0^5 + \delta_1^5 Q_t + \delta_2^5 A_t + \delta_3^5 M_t + \delta_4^5 S_t + \delta_5^5 Z_t^w + \delta_6^5 X_t^w + \mu_5 + \upsilon_{5t} \quad \forall t = 2,..., T\end{aligned} \tag{30}$$

Attrition

In Chapter 4, I describe the COMBINE sample and note the attrition over time of a portion of the participants. Whether or not an individual leaves the study is likely correlated with his employment, alcohol and treatment outcomes. Therefore, I include an equation to estimate the probability of attriting, O_{t+1}. The equation is estimated jointly with the other equations in the model and uses a similar specification as other per-period choices as well as permanent and time-varying unobservables. Attrition is defined as an individual not completing all nine possible interviews. However, it is modeled as though it is determined at the end of period t after all other period t behaviors have occurred. Thus attrition, O_t, is modeled as a function of state variables that have been updated for period t+1.

$$\begin{aligned}&\ln\left[\frac{\Pr(O_{t+1}=1)}{\Pr(O_{t+1}=0)} \mid \mu_6^O, \upsilon_{6t}^O\right] = \\ &\delta_0^{6,o} + \delta_1^{6,o} Q_{t+1} + \delta_2^{6,o} A_{t+1} + \delta_3^{6,o} M_{t+1} + \delta_4^{6,o} S_{t+1} \\ &+ \delta_5^{6,o} Z_t + \delta_6^{6,o} X_t + \mu_6 + \upsilon_{6t} \quad \forall t = 2,..., T\end{aligned} \tag{31}$$

An individual's likelihood contribution is thus

$$
\begin{aligned}
&L_i(\Theta,\psi \mid \mu_1,\mu_2,\mu_3,\mu_4,\mu_5,\mu_6,\mu_7,\mu_8,\mu_9,\mu_{10},\mu_{11}) = \\
&\prod_{t=1}^{T}\sum_{l=1}^{L}\psi_l \left[\begin{array}{l}
\prod_{e=0}^{3}\Pr(e_t = e \mid \mu_1^e,\upsilon_{1t,l}^e) * 1[e_{i,t} = e] \times \\
[\frac{1}{\sigma_w}\Phi(\log wage_t \mid \mu_5,\upsilon_{5t,l},e_{i,t} > 0)]^{e_{i,t}} \\
\prod_{a=0}^{3}\Pr(a_t = a \mid \mu_2^a,\upsilon_{2t,l}^a) * 1[a_{i,t} = a] \times \\
\prod_{m=0}^{4}\Pr(m_t = m \mid \mu_3^m,\upsilon_{3t,l}^m) * 1[m_{i,t} = m] \times \\
\Pr(S_t = 1 \mid \mu_4,\upsilon_{4t,l})^{S_{i,t}} \times (1 - \Pr(S_{i,t} = 1 \mid \mu_4,\upsilon_{4t,l}))^{1-S_{i,t}} \\
\Pr(O_t = 1 \mid \mu_6,\upsilon_{6t,l})^{O_{i,t}} \times (1 - \Pr(O_{i,t} = 1 \mid \mu_6,\upsilon_{6t,l}))^{1-O_{i,t}}
\end{array}\right] \times \\
&\prod_{e=0}^{3}\Pr(e_1 = e \mid \mu_7^e) * 1[e_{i,1} = e] \times \\
&\prod_{a=0}^{3}\Pr(a_1 = a \mid \mu_8^a) * 1[a_{i,1} = a] \times \\
&\prod_{m=0}^{4}\Pr(m_1 = m \mid \mu_9^m) * 1[m_{i,1} = m] \\
&\Pr(S_1 = 1 \mid \mu_{10},)^{S_{i,1}} \times (1 - \Pr(S_{i,1} = 1 \mid \mu_{10}))^{1-S_{i,1}} \\
&[\frac{1}{\sigma_{educ}}\Phi(Years\_Educ_1 \mid \mu_{11})]^{t=1}
\end{aligned}
\tag{32}
$$

where Θ is the vector of variables that will be estimated. The distribution of υ_l is

$$
\begin{aligned}
\psi_l = \Pr(&\upsilon_{1t}^1 = \upsilon_{1t,l}^1 ....\upsilon_{1t}^3 = \upsilon_{1l}^3, \\
&\upsilon_{2t}^1 = \upsilon_{2t,l}^1 ....\upsilon_{2t}^3 = \upsilon_{2l}^3, \\
&\upsilon_{3t}^1 = \upsilon_{3t,l}^1 .....\upsilon_{3t}^3 = \upsilon_{3l}^3, \\
&\upsilon_{4t} = \upsilon_{4tl} \\
&\upsilon_{5t} = \upsilon_{5tl} \\
&\upsilon_{6t} = \upsilon_{6tl}), \quad \forall l
\end{aligned}
\tag{33}
$$

where L is the number of time varying mass points. Then

$$L_i(\Theta,\psi,\pi) = \sum_{k=1}^{K} \pi_k * L_i(\Theta,\psi \mid \mu_{1k},\mu_{2k},\mu_{3k},\mu_{4k},\mu_{5k},\mu_{6k},\mu_{7k},\mu_{8k},\mu_{9k},\mu_{10k},\mu_{11k}) \quad (34)$$

And the distribution of the permanent unobserved heterogeneity is

$$\begin{aligned}\pi_k = \Pr(&\mu_1^1 = \mu_{1k}^1,....\mu_1^3 = \mu_{1k}^3, \mu_2^1 = \mu_{2k}^1,....\mu_2^3 = \mu_{2k}^3, \mu_3^1 = \mu_{3k}^1,....\mu_3^3 = \mu_{3k}^3, \\ &\mu_4 = \mu_{4k}, \mu_5 = \mu_{5k}, \mu_6 = \mu_{6k}, \mu_7^1 = \mu_{7k}^1,....\mu_7^3 = \mu_{7k}^3, \mu_8^1 = \mu_{8k}^1,....\mu_8^3 = \mu_{8k}^3, \\ &\mu_9^1 = \mu_{9k}^1,....\mu_9^3 = \mu_{9k}^3, \mu_{10} = \mu_{10k}, \mu_{11} = \mu_{11k}) \quad \forall k = 1,...K\end{aligned} \quad (35)$$

Initial Conditions

The initial period contributions to the likelihood function, $\Pr(e_1 = \mathrm{e} \mid \mu_7^e)$, $\Pr(a_1 = \mathrm{a} \mid \mu_8^a)$, $\Pr(m_1 = \mathrm{m} \mid \mu_9^m)$ and $\Pr(s_1 = \mathrm{s} \mid \mu_{10}^s)$, show that beginning employment, drinking, alcohol treatment, and antidepressant choices are functions of permanent heterogeneity. Since I do not observe an individual's choices prior to data collection, I estimate them within the likelihood function above as reduced form functions of variables observed prior to and during period 1 and permanent heterogeneity. In addition to these four initially-observed behaviors, I also considered initial marriage and education status which, though static within my study, may be endogenous. The inclusion of exogenous marriage did not substantially change any of my primary marginal effects estimates. Treating education as exogenous led to large enough differences in estimates that I chose to also include an IC equation for years of education which is correlated with initially-observed behaviors and subsequent behaviors through observed individual characteristics, as well as permanent unobserved heterogeneity.

To achieve consistent causal estimates, I estimate the IC equations with plausibly exogenous variables that should influence an individual's initial state variables, but not

be correlated with (i.e., excludable from) subsequent per-period outcomes, conditional on the inclusion of the state variables. Hereafter, I describe the exclusion restrictions I use for initial employment, drinking, treatment for AUDs, antidepressants and marriage and results of their statistical testing. Appendix A.9 lists the specific exclusion restrictions. I include the full set of exclusion restrictions in all IC equations. Appendix B.8-B.12 provides results for exclusion restrictions. Wald tests of excludability in the per-period outcome equations are reported in Appendix Table B.13. Wald tests were calculated using the covariance matrix estimated from the unrestricted version of my full DFRE model that modeled permanent and time-varying unobserved heterogeneity.

For initial employment, I use local period 1 construction and manufacturing wages and the interaction of current period gas prices, the individual's travel time to the COMBINE study site and Treatment Arm 5 in a multinomial logit model. At least one of these wages statistically significantly explains each level of employment relative to "No Employment" or between other employment outcomes. A joint test of their significance in the IC equation has a p of .045. None of the historical wages are significant in these models and they are jointly insignificant using a Wald test (p=.716).

As my analyses focus on the periods following study treatment, I observe two distinct "initial" periods: the time before randomization and the time during randomized treatment. The distinction between the periods is particularly relevant for alcohol. Because of the inclusion criteria of the study, everyone in Period 1 experienced weeks with problem drinking. Therefore, I only estimate a logit model of whether problem weeks occurred more or less than 50% of the period and do not include covariates relevant only to Period 2 (e.g., COMBINE treatment arms). The key exclusion

restrictions are an interaction of average number of unused OP sessions and sliding scale fee and whether a parent of the individual also had an AUD X patient age. These are individually significant and jointly significant (p=.043). For Period 2 drinking, I use three variables: the interaction of average number of unused OP sessions and sliding scale fee, the interaction of Arm5, gas price at Time 1, and travel time to study site, and the interaction of Arm 7 with gas price at Time 1 and travel time to study site. At least one of these variables is significant for each drinking outcome relative to abstinence. Note then that for initial alcohol, I have four exclusion restrictions across two time periods. I test all four of these jointly in the dynamic per period alcohol equation and find them insignificant (p=.949). For SH visits in Period 1, I use the manufacturing wage and the average number of unused OP sessions interacted with the sliding scale fee. These are individually and jointly significant in the IC equation and jointly insignificant in the per-period alcohol treatment equations. For antidepressant use, I use the interaction between an indicator of parent AUD and average home price and the construction wage which are individually and jointly significant in the IC equation and jointly insignificant in the per-period antidepressant equation (p=.185). The equation for years of education uses the indicator of a parent with AUD and that indicator interacted with patient age as exclusion restrictions. I test these individually for five per-period outcome equations: employment, alcohol, treatment, antidepressants, and log wages. They are jointly insignificant for all of these, although in the log wage equation there was a strong correlation at p=.101.

I did not estimate IC models for OPC and RxT during study treatment (Period 2) since randomization almost definitionally predicts their consumption with adherence (>14 days of pill use and >3 OPC visits) with measurement error being only a marginal

source of variation. Conceptually, randomization is an ideal exclusion. It is an exogenous predictor of OPC and RxT. The main concerns with relying on randomization are participant compliance and attrition from the study which would induce a degree of endogeneity. Fortunately, during the four months of treatment, attrition in COMBINE and adherence to medication was limited (Anton, 2006). Moreover, among the COMBINE economics study participants that I use in this study, no individuals failed to meet my minimum threshold for OPC and RxT use. In fact, over 98% of my sample used the OPC and RxT more than half of the four month study period. Period 2 COMBINE treatment is included in the per-period model as part of the state variables for past treatment. Although randomization (e.g., an actual coin flip) should have no correlation with subsequent outcomes other than through the Period 2 treatment, I do include indicators of study arms in all IC and per-period equations. I do not estimate a Period 1 IC for RxT use because only 9 out of 775 individuals consumed any RxT during that period.

Identification for the effects I am analyzing comes from several sources. First, the exclusion restrictions for the initial conditions are the foundation for removing endogeneity from estimates for my lagged dependent variables (which are manifested through accumulated history of behavior). Next, both the initial condition equations and the dynamic per-period equations include a large set of exogenous prices and environmental characteristics which vary over time and across geography. Though not formally tested, prices (and other covariates) from prior periods are excluded from the outcome equations for later periods (which use the current values of these variables). Inasmuch as all of these exogenous variables influence outcomes in a given period, the estimates for the state

variables (updated based on those outcomes) in later periods are even better identified (Arellano and Bond, 1991). Finally, timing itself is a key component in my empirical model. Estimates of the effect of an endogenous history (e.g., representing recent drinking) on a current outcome (e.g., employment), should be free of any simultaneity bias (especially when based on a theoretical model that has made clear assumptions about the sequence of forward-looking choices and their subsequent consequences.)

The identification strategy above is conceptually similar to IV and generalized method of moments estimators. Nonetheless, I focus on estimates that I describe as "marginal effects" rather than more typical IV language like "local average treatment effect" (LATE). First, LATE is a somewhat narrow term that focuses formally on "treatment effects" and does not reflect the dynamic system of multiple related outcomes and the multiple sources of identification. For example, LATE might appropriately apply to coefficient estimates of the effect of COMBINE alcohol treatment (instrumented using randomization and the same exclusion restrictions I present above) on contemporaneous drinking. However, my estimates reflect how changes in such initial (and per-period) behaviors influence outcomes over multiple discrete time periods and through all the other related behaviors conditional on covariates and unobserved heterogeneity. More importantly, my framework is not to simply instrument treatment. In fact, actual treatment received is a function not only of randomization but of other variables like travel time to the study site and gas prices and unobserved heterogeneity (correlated with other outcomes), all of which create a reasonable proxy for compliance. In addition, all of the behaviors besides treatment are also modeled as initial conditions such that subsequent outcomes are not simply functions of instrumented treatment.

Model Specification

The per-period demand behaviors are functions of endogenous variables representing past behaviors. Since these variables are the main theoretical drivers of outcomes over time, I explore alternative specifications of these variables as determinants depending on explicit assumptions about the timing of individual behaviors in the theoretical model. The specifications also allow for different inclusion of variants of the history of behavior. For example, a state variable constructed as the total number of past periods in which an outcome occurred such as work experience or total treatment episodes has the appeal of capturing a 'dose effect'. It also crudely captures the effect of having *ever* experienced a particular outcome. A key drawback though is that the range of its values in the first period following COMBINE treatment would be [0, 2] while in the last outcome period (7 periods after COMBINE treatment) the range would be [0, 8]. Model estimates will not perfectly reflect any effect of the *recency* of past outcomes. Two individuals might enter the final outcome period with exactly 1 past period of a particular outcome. The model would be naïve about whether their outcome of "1" had occurred in the previous period or 7 periods in the past.

An alternative to the accumulation stock variable is the sum of periods *since* a particular outcome occurred. This construction better represents any differential effect of recency as well as tenure (i.e., periods since unemployed). However, it ignores any effect of persistence in outcomes or a dose effect. It should be noted that the accumulation and the "time since" state variables are linear combinations of each other when they take on extreme values (and when a continuous time covariate is included in the model); having an outcome in every past period is a value of 8 for the accumulation stock and a value of 0 for the "time since" state. These state variables are thus fairly equivalent for individuals who tend toward

path dependence. For less path dependent individuals who switch outcomes over time, there is no a priori reason to favor either construction.

A third type of state variable representing past behaviors is rolling lagged outcomes limited to a specific timeframe (e.g., outcome_{t-1} or $\sum_{i=t-1}^{i=t-k} outcome_i$). This type of state variable has less 'memory' and can thus have the same range of values regardless of time period. To the extent that longer patterns of past outcomes are important drivers of current outcomes, less memory is a drawback. Less memory is arguably a more important consideration in this study. The initial study period is not simply a first wave of data collection but a large shock or reset to the course of an individual's drinking outcomes. An individual enters treatment at a particular point in his natural history (e.g., a nadir or on a long run plateau) expecting some change in his trajectory. There is even more reason to expect a nontrivial initial shock for a COMBINE patient. He has detoxed and remained abstinent for at least 4 days and has a high probability of receiving at least one efficacious treatment (only $1/9^{th}$ received neither active medication nor CBI). Being a randomized controlled trial (RCT), there is an intensity and level of engagement above what most treatment seekers experience in non-research settings. In contrast to observational panel data, the course of outcomes over time is appropriately kept in the context of "starting with COMBINE treatment" and evolving from that point. In such a context, "8 consecutive periods" of an outcome is meaningful, whereas in an observational study, such an accumulation would seem more arbitrary and would misrepresent the true but unobserved state variables in the early waves of data collection.

Given the potential advantages of each of the three state variable constructions, I estimate models with combinations of each. However, many possible combinations were either not possible or not computationally feasible due to multicollinearity. There simply is

not enough variation within and across individuals to support constructing state variables more than one or two ways at a time. This is particularly problematic in the case of the mutually exclusive multinomial outcomes I use for employment, alcohol use, and alcohol treatment whose state variables are already partially correlated by definition. A similar problem exists when interacting the state variables for drinking history and alcohol treatment history. In almost every case, these saturate the models. In the few cases where "cherry-picked" interactions are able to be estimated, their impact on overall marginal effects is negligible.

Based on feasibility and model fit, my preferred model is one that uses one state variable for each unique multinomial outcome (ignoring the reference category). For all outcomes except for alcohol treatment, I use on the total number of past periods in which the outcome occurred. For alcohol treatment, model fit for per-period treatment choices is improved with "time since" variables. I do not use any state variables that are indicators of behaviors in the last period only. With the exception of slightly improved fit when looking at outcomes over time in the first one or two periods after COMBINE treatment, lagged state variables decreased overall fit. Final model specification, coefficient estimates, and standard errors are available in Appendix Tables B.1-B.12.

CHAPTER VI. RESULTS

Estimates and Fit

I estimate a model of employment and alcohol use outcomes during the 2.5 years following treatment for alcohol dependence in the COMBINE randomized control trial. In this model I jointly estimate equations for per-period (every 4 month) employment status, conditional log wages, drinking status, treatment for alcohol dependence, pharmacotherapy for mental health, and attrition from the study. Along with these per-period outcomes the model includes equations for initial employment, drinking status, and self-help therapy for alcohol dependence (occurring immediately before and during COMBINE treatment) as well as lifetime years of education at the beginning of the study. The correlated structure of the errors in these equations incorporates permanent and time varying unobserved individual heterogeneity that is modeled using Discrete Factor Random Effects (DFRE) method.

Model Fit

To assess the accuracy of my model, I compared actual sample values of outcomes to those predicted by the empirical model for the analysis periods following COMBINE treatment. Predictions from my model are produced by multiplying coefficient estimates by observed explanatory variable values except for the endogenous right-hand side state variables described above. Rather than original sample values, these state variables are updated during each period of the model based on the previous period's predictions (and

initial values). Also, the empirical predictions account for unobserved heterogeneity which is an important part of estimation. Given the estimated, discrete distribution of unobserved heterogeneity, individuals in the simulated sample draw both their permanent type as well as the shock each period. Appendix Tables C.1 and C.2 show the comparisons between these simulated values and the observed outcomes. Row 1 of Appendix Table C.1 shows the observed values for employment, log wage, alcohol and alcohol treatment outcomes. Moving down from Row 1 are simulated values based on incrementing the points of support for permanent and time-varying heterogeneity. The final model uses seven and five mass points for permanent and time-varying heterogeneity, respectively. I increased mass points as long as the overall likelihood did not decrease and the weight for any given mass point was not less than .01. For all outcomes, simulated values are very close to observed values, suggesting strong model fit. All simulated values are within one percentage point of observed values. Appendix Table C.2 shows model fit over time. Simulated values have a narrower range than observed values. Nonetheless, they do track the overall direction of movement in observed outcomes over time. Appendix Figures E.1, E.2, and E.3 illustrate model fit over time for employment, alcohol consumption, and alcohol treatment consumption.

Simulations for Marginal Effects and Policy Experiment Effects

Both marginal effects and policy experiment effects are presented two ways---first, as the average effects across all periods after COMBINE treatment and second, as the effects by time since the end of COMBINE treatment. For some relationships being evaluated, I focus on the aggregated over time outcome while for others the long run outcomes or trend make more sense. Estimates of marginal effects and policy experiment effects rely on a similar

method. A 'margin' must be defined, e.g., a one-unit increase in an independent variable or the alternative categories of a multinomial variable. This margin must have a meaningful relationship with the outcome of interest in terms of the theoretical model, their sequencing, and the time frame of outcome measurement. The margin should not be so extreme in magnitude that it does not make sense within the empirical model and the identification strategy. I estimate the effect of three alternative behavioral outcomes on predicted model behaviors. These include:

1. Alternative drinking outcomes during COMBINE treatment (in Period 2): Abstinent, Non-Problem Drinking Only (NPD), Problem Drinking <50% of Period (PDL), and Problem Drinking >50% of Period (PDH).
2. Alternative one period lagged employment outcomes: Not employed, Employed <90% of period, Employed Part-time >90% of Period, and Employed Full-time >90% of Period.
3. Each of the nine COMBINE treatment arms: Medication Management (MM) Only, Acamprosate + MM, Naltrexone + MM, Acamprosate + Naltrexone + MM, MM + CBI, Acamprosate + MM + CBI, Naltrexone +MM + CBI, and CBI only.

To implement these (and also later to perform policy experiments) I use the same simulation procedure used to evaluate model fit, I change, however, the value of the relevant state variables in the relevant time periods. For example, for the marginal effects of drinking outcomes during COMBINE treatment, I adjust the drinking history state variables so that individuals enter period 3 (the first period after COMBINE treatment) with a history that reflects the imposed period 2 outcome. After this adjustment, outcomes are simulated for

periods 3-9 as normal, with no more artificial adjustments. Period 2 drinking affects subsequent outcomes both through the initial changes in state variables (which remains as a +/-1 in the state variables over all time periods) and through cumulative secondary effects. For example, abstinence in period 2 means that subsequent drinking state variables are lower by 1. In addition, abstinence in period 3 is now likelier (due to the adjusted state variables), leading to drinking state variables that favor abstinence even more in period 4, etc.

I repeat this step for the remaining three drinking outcomes and calculate pairwise mean differences in periods 3-9 outcomes between all four period 2 drinking outcomes. In order to test the statistical significance of differences, I use parametric bootstrapping in which I repeatedly perturb the coefficients from the variance-covariance matrix estimated by the DFRE 100 times.

During each period from 3 to 9, the employment state variables are changed to reflect the imposed employment outcome in the preceding period. For example, for the one-period effect of *no employment*, current period outcomes are simulated using state variables that were updated based on prior period outcomes except that the employment state variables are revised to reflect *no employment* in the previous period. The original employment state variables are preserved to be used for end-of-period updating. After current period outcomes are simulated, state variables are updated normally except for the employment state variables. The no employment-adjusted state variables are discarded and the original employment state variables are used. This maintains the "per period" nature of the experiment and avoids the artificial accumulation of imposed lagged employment outcomes.

Marginal Effects

In Appendix Table D.1, I present the marginal effects of drinking in COMBINE treatment on subsequent outcomes. Any drinking (NPD, PDL, and PDH) relative to abstinence during the COMBINE treatment has a dramatic negative impact on subsequent abstinence, ranging from 15.4 percentage points for PDL to 20.4 percentage points for NPD ($p<.001$ for all three cases). For PDH versus abstinence, 17.0 percentage point decrease in abstainers corresponds to an 18.1 percentage point increase in subsequent PDH but virtually no increase in PDL. Likewise, PDL versus abstinence during COMBINE treatment has a relatively small impact on PDH (<4 percentage points) and only a 1 percentage point increase in NPD. NPD relative to abstinence increases subsequent NPD by 13.7 percentage points and PDL by 9.8 percentage points, but has limited impact on PDH. Any drinking relative to abstinence resulted in a decrease in log wages of .045 to .06 ($p<.001$ for all).

Focusing on abstinence in the individual periods following COMBINE, non-abstinence drinking outcomes during COMBINE treatment have greater effects in the first one to three periods than in later periods (see Appendix Tables D.3-D.8 or Figure 4 in Appendix E). For example in Appendix D.4, NPD reduces abstinence in Period 3 by 12.5 percentage points and in Period 4 by 16.7 percentage points. In Periods 7, 8, and 9, the effect has reached a steady state of around -25 percentage points. A similar pattern is seen for PDH and PDL, although both of those reach a steady marginal difference in abstinence of around -17 percentage points.

Only heavy drinking outcomes during COMBINE treatment have measureable and significant effects on subsequent employment. PDL increases unemployment by 3.8 percentage points ($p<.001$) and PDH by 1.9 percentage points ($p=.075$). They both increases

the < 90% employment outcome by about 3.8 percentage points (p<.001). Greater than 90% full-time employment is 7.5 percentage points lower for PDL and 5.6 percentage points lower for PDH (p<.01 for both). (See Appendix Table D.1.) From Appendix E Figure 5 effects on employment are initially small and reach their largest size by the later periods. The magnitudes in the later periods are roughly equivalent in size to the overall post-treatment averages described in Appendix Table D.1.

Comparisons to marginal effects of drinking in Time 2 without controlling for unobserved heterogeneity

I compare the estimates of the marginal effects of Time 2 drinking outcomes, based on models with and without UH (Appendix Tables D.1 and D.2). Whereas we found a 20.4 percentage point (pp) decrease in long-run abstinence for NPD in a model that accounts for UH, in the models without UH, there was a 28.8 pp decrease. The no-UH models overestimate the negative impact of NPD on long-run abstinence by 8 pp. Similarly, the no-UH model overestimated the increase in long-run NPD and PDL. Comparing among the drinking outcomes at Time 2, the UH model would finds positive effects on long-run abstinence of problem drinking (both PDL and PDH) versus NPD during the treatment period. However, the model without UH finds PDH relative to NPD to be a significant -6.8 pp on long-run abstinence. Changes in employment outcomes following COMBINE treatment were overestimated by the no-UH model by when comparing PDL and PDH to abstinence. For example, PDH has a negative effect of 3.8 pp on employed full time >90% for the UH model, while the no-UH model estimate was a 5.6 pp decrease. The no-UH models also underestimates the impact of NPD at Time 2 (v. abstinence) on log wages, finding no effect. No UH estimates for PDL and PDH are slightly higher than UH estimates.

Marginal effects of the alternative COMBINE treatment arms

For the COMBINE treatment arms, the approach was similar to that for COMBINE treatment alcohol in that the treatment history variables were adjusted to reflect the imposition of one of nine treatment arms. However, since my model includes treatment arms as time invariant indicator variables, when estimating outcomes in periods 3-9, these also were updated. In the first period following COMBINE treatment, all of the treatment arms except for Medication Management Only (MMO) predict abstinence for approximately 24% of the population (see Appendix Figure E.6). A similar pattern is seen for PDH. Following the first post-COMBINE treatment period, Acamprosate + Naltrexone + Medication Management (ANMM) is the arm that shows the greatest difference over time in drinking outcomes. The highest levels of abstinence are achieved by this arm as well as the lowest levels of PDH over the remaining periods. All of the increase in abstinence and decrease in PDH occur by the sixth period following COMBINE treatment, after which the population averages remain stable. As shown in Appendix Table D.11, ANMM increased abstinence overall by 8.3 percentage points (p=.016) relative to Acamprosate + Medication Management + Cognitive Behavioral Intervention (AMMC) and 8.8 percentage points (p=.009) relative to Naltrexone + Medication Management + Cognitive Behavioral Intervention (NMMC). Though predicted abstinence was higher for ANMM than all other treatment arms, magnitudes were smaller and were not significant. Although ANMM predicted consistently lower rates of PDH over time, the only significant effect was relative to NMMC (-7.5 percentage points, p=.01). Cognitive Behavioral Intervention Only (CBI) decreased predicted use of pharmacotherapy relative to all other treatment arms. These differences were not significant for MMO, AMMC, and Medication Management + Cognitive Behavioral

Intervention (MMC). Naltrexone + Medication Management predicted the lowest use of any treatment, with all differences being significant at the .05 level or better.

Marginal effects of lagged employment status.

Being employed (<90% of period, part time >90% of period, or full time >90% of period) in the previous period predicts a 6-9 pp decrease in being unemployed in the current period (all significant at the .001 level). Being employed full time >90% of the period in the previous period predicts a 13.3 pp increase in being employed full time >90% of the period in the current period. The effect of one-period lagged employment on drinking outcomes in the current period is small. Employed <90% of period led to a 2.7 percentage point decrease in PDH (p=.007) and a 2.3 percentage points increase in abstinence (p=.006). Employed >90% of the period part-time) decreased PDH by 1.5 percentage points (p<.001). Lagged employment status had little notable impact on current treatment use.. (See Appendix Table D.9.)

Comparisons to marginal effects of lagged employment status without controlling for unobserved heterogeneity

Estimates of the marginal effects on employment status of lagged employment from the no-UH model were very similar to those of the UH models. Marginal effects of the lagged employment outcomes relative to each other were virtually the same between the UH and no-UH models. In the no-UH model, being employed >90% of the previous period (part-time or full-time) had large and significant effects on the current period log wage (.068 and .076, respectively). However, when controlling for UH, the effect of full-time employment

was smaller (.047). The UH model estimated a positive .026 ($p<.01$) effect on log wages of being employed <90% of the period while the no UH model found no effect. (See Appendix Tables D.9 and D.10.)

Policy Simulations

The first policy simulations involve changes in the prices of gasoline, beer, and Naltrexone. These simulations increment prices by 5 and 10% and compare outcomes over periods 3-9 to simulate outcomes using the original prices on which the models are estimated. For Naltrexone, there is virtually no effect and the results are not presented in this study. Although beer prices had the same direction of effect as gasoline prices, none of the results are significant and the magnitudes are smaller than gasoline prices. These results are not reported in this study. The second type of policy simulation focuses on increasing adherence to different alcohol treatment and increasing the dosage in terms of four-month periods. Forcing adherence both in COMBINE treatment (Period = 2) and by changing the thresholds of measurement during per period outcomes does not change outcomes in any meaningful way and are not reported in this study.

Marginal Effects of Increased Gasoline Prices

For this experiment, I vary the existing gasoline prices, increasing them by 5 and 10% to proxy for the potential policy of increasing gasoline taxes. Ten percent higher gasoline prices predict 3.5 percentage points higher abstinence ($p=.005$). This increase in abstinence corresponds to a 1.4 pp decrease in PDL ($p=.033$) and a 2.2 pp decrease in PDH ($p=.031$). Changes in gas prices have no effect on PDH. Though significantly different, the effects for a

5% increase in gas prices are of a lesser magnitude than those for the 10% increase. (See Appendix Table D.14 and Appendix Figure E.9).

Marginal Effects of Extended Pharmacotherapy

The motivation for this experiment is based around the conventions and recommended dosages for Naltrexone and other RxTs for AUDs. Currently common practice for Naltrexone is a 60-90 day prescription which corresponds to the length in most RCTs. However, given the nature of AUDs as "chronic relapsing disorders" and the fact that the mechanisms of action of these modern RxTs is to decrease craving and "maintain recovery," a relevant consideration for primary care physicians and addition science is the extension or ongoing use of these medications. This experiment also has relevance for alternative RxT delivery systems. Vivitrol was approved by the FDA in 2005. It is injectable Naltrexone and delivers a dose lasting 30 days, and there is exploration into longer term injections. In this policy experiment, during any given period in which an individual consumed pharmacotherapy, I impose RxT as their outcome in the next period regardless of what they actually consumed. Their state variables going into the next period are incremented according to this. Whenever this "second period of RxT' was imposed, it did not trigger a third RxT in the following period. However, I did record actual treatment outcomes during periods in which RxT was imposed artificially. If the actual second period treatment for an individual was RxT, then they did get the third period RxT.

The two-period RxT rule has an unequivocally positive effect on drinking outcomes. Abstinence increases by 4.6 pp ($p<.001$). PDH decreases by 2.6 pp ($p=.005$). There are small and not significant differences in NPD and PDL. There is no effect on employment for this experiment. As expected, alcohol treatment use is changed by the experiment. Notably, the

decrease in SH visits and OPC are not large (.03 and .01, respectively). Correspondingly, the increase in RxT periods replaced periods with no treatment. (-12.5 pp, $p<.001$). Interestingly, antidepressant use increases by 3.5pp ($p<.001$). (See Appendix Table D.15.)

CHAPTER VII. CONCLUSION

In this study, I estimate the direct impact of drinking and treatment outcomes from a randomized control trial (RCT) of therapies for Alcohol Use Disorders (AUDs) on subsequent drinking and employment outcomes. The trial, COMBINE, randomized patients into one of nine treatment arms to study the effect of two pharmacotherapies and a cognitive behavioral intervention. The original COMBINE study found inconsistent and only weak effects of the different therapies on short-term drinking outcomes. In this study, I use a larger set of data from the COMBINE economics study that collected longitudinal outcomes for an additional three years following a trial. In addition to drinking, the supplemental data collection included employment outcomes and ongoing therapies for AUDs that were not part of the original trial therapies. I estimate a dynamic model of changes in drinking and employment outcomes over time that incorporated the role of treatment seeking and disentangles the endogeneity of simultaneous outcomes. I achieve this by estimating the outcomes jointly using the Discrete Factor Random Effects (DFRE) method and modeled permanent and time-varying unobserved heterogeneity. While these data are not completely representative of all individuals with AUDs, the goals of this study went beyond evaluating the COMBINE trial therapies to better understand how outcomes evolve over time. COMBINE provide rich and unique data which allow not only a revisit to COMBINE treatment, but also a window into the interaction of employment, drinking, and treatment

choices. It also provides an opportunity to explore the effects of policies targeting a population with AUDs.

My primary results are that drinking outcomes during treatment (in this case, the COMBINE trial) have large and lasting effects on subsequent drinking, though the effects stabilize over the long term. If abstinence was achieved during the trial, then the probability of being abstinent in the periods following the trial is at least 0.15. In evaluating the effects of non-problem drinking (NPD) and problem drinking <50% of period (PDL) as treatment outcomes, care must be taken when the long-run outcome of interest is abstinence. PDL during treatment is associated with 5.0 percentage point (pp) higher abstinence relative to NPD during treatment. However, it appears that a portion of non-problem drinkers at the time of treatment, though not abstinent, maintain NPD. In contrast, PDL at the time of treatment does not lead to future NPD and sees a 0.119 increase in the probability of PDH. Problem drinking relative to abstinence resulted in modest increases to not being employed and sizable decreases to being employed full-time >90% of the period (4-6 pp). Wages were higher for those who achieved abstinence during COMBINE treatment on the order $.90 - $1.05 per hour. When comparing these results to the same marginal effects from a naïve model that ignores unobserved heterogeneity, I find that the latter estimates are generally biased. The no-UH model underestimates the impact of drinking outcomes during treatment on subsequent drinking and overestimates the effects on employment outcomes.

Not being employed is associated with less abstinence and slightly more problem drinking. Full time employment over 90% of the period leads to a slight increase in problem drinking greater than 50% of the period when compared to being employed part time or <90% of the period. In many observational studies, there is a commonly found association

between problem drinking and employment outcomes. Moreover, a common conceptualization of this is that individuals that are both high functioning and drink heavily due to some unobserved characteristic (e.g. a risk-seeking personality or a social elixir). However, in this study, by modeling permanent unobserved heterogeneity, I exclude such characteristics in an attempt to isolate the effect of employment on drinking. The period-to-period effect of employment on levels of drinking is likely due to an income effect. It is also important to note, though, that the time frame used in my study reflect a narrow range of employment outcomes and heavy drinking behaviors. Over a longer time horizon, the positive effect of employment on PDH is not likely sustainable by individuals.

I also simulate how increases in the prices of gasoline and beer and decreases in the price of Naltrexone might influence drinking outcomes. Although changes in beer price of 5 and 10% had the correct sign, they are not significant for changing any outcome. It is of note that beer prices may not reflect the products most used by every drinker in the COMBINE study and thus understate the influence of prices on consumption behavior. Changes in the price of Naltrexone had virtually no effect on outcomes. It is arguable that the price of Naltrexone may be undetectable for both theoretical and empirical reasons. Given that I do not observe insurance status, nor what individuals actually paid for their medications, it is possible that the proxy price for Naltrexone is simply not relevant. Similar to beer prices, though, gas prices are arguably a better proxy for real costs faced by these patients in the quarter and community in which they reside. Moreover, during this time period, gas prices are highly variable both across geographic location and over time (2001-2007). In contrast to beer prices, gas prices have a clear and consistent income effect across all alcohol outcomes. The income effect from changes in beer prices is variable depending on how much someone

drinks. Gas prices relate to employment in a different way than beer prices. While someone chooses to work in order to drink, gas prices affect both the cost of general consumption as well as the cost of employment (leading to a lower real wage income). Gas prices also influence the cost of treatment regardless of insurance status. Ten percent higher gasoline prices predicted 3.5 percentage points higher abstinence (p=.004).

Returning to RxT as a policy lever for drinking, rather than relying on price effects, I imposed a two-period (~8 months) minimum for any RxT. The two-period RxT rule had an unequivocally positive effect on drinking outcomes. Abstinence increased by 4.6 pp (p<.001) and PDH decreased by 2.6 pp (p=.005). This experiment relies in part on the fact that I defined my treatment variables such that RxT superseded SH and OPC. It is thus important to note that this artificial the increase in treatment came primarily at the expense of "No Treatment" periods; displacement of SH and OPC periods was minimal. This extension reflects a key policy and clinical opportunity since the conventions and recommended dosages for Naltrexone and other RxTs for AUDs are currently 60-90 day prescription. However, given the nature of AUDs as "chronic relapsing disorders" and the fact that the mechanisms of action of these modern RxTs is to decrease craving and "maintain recovery," a relevant consideration for primary care physicians and addition science is the extension or ongoing use of these medications.

Appendix A. Main Tables

Appendix Table A.1. Determination of Sample

Criteria	Number of Individuals in Sample	Number of Observations
Randomized into COMBINE Study Groups	1,383	
Completed COMBINE Study Treatment	1,226	
Completed COMBINE Study Treatment in the 9 Continuing Sites	991	
Participated in 3 Year Economic Data Collection	792	
Time Periods		
0 - Prior to Randomization	775	775
1 - Randomization to End of Study Treatment	775	775
2 - After Study Treatment - Data Collection Only	775	775
3 - After Study Treatment - Data Collection Only	775	775
4 - After Study Treatment - Data Collection Only	775	775
5 - After Study Treatment - Data Collection Only	745	745
6 - After Study Treatment - Data Collection Only	704	704
7 - After Study Treatment - Data Collection Only	650	650
8 - After Study Treatment - Data Collection Only	570	570
Final Analysis Sample Time 3-9	775	4,994

Appendix Table A.2. Variable Definitions

Variable	Detail
Employment Outcomes	
Not Employed	Reported no days of work during entire period.
Employed Less Than 90% of Period	Employed less than 90% of the length of the period
Employed Part Time > 90% of Period	Employed more than 90% of the length of the period, < 35 hours per week
Employed Full Time > 90% of Period	Employed more than 90% of the length of the period, ≥ 35 hours per week
Current Alcohol Consumption Outcomes	Note: Problem drinking is defined as a week in which at least one day of Problem Drinking occurred (5+ drinks for men, 4+ for women) or in which 14+ total drinks were consumed.
Abstinent	No days of drinking were reported during the period.
Non-Problem Drinking Only	Days of drinking were reported during the period, but no problem drinking occurred. Problem drinking includes either a week in which a problem drinking day occurred (5+ drinks for men, 4+ for women) or a week in which 14 or more drinks were consumed.
Problem Drinking Less than 50% of Period	At least one problem drinking week occurred but not more than 50% of the period were problem drinking weeks.
Problem Drinking More than 50% of Period	More than 50% of the period were problem drinking weeks.
Current Treatment for Managing Drinking	Note: Outcomes were counted for a period when quantities were above specific levels: Self-Help Visits - >7 in period, Outpatient Counseling Visits - > 3 in period, Pharmacotherapy Consumed to Prevent or Control Drinking - >14 days in period. Pharmacotherapies include Naltrexone, Acamprosate, Disulfiram, Quetiapine, Topiramate, Gabapentin and Neurontin when prescribed for alcohol use.
No Treatment	No treatment modalities were reported during the period
Self Help Visits	Only self-help visits were reported during the period
Outpatient Therapy (No RxT)	Outpatient counseling visits or outpatient counseling and self-help visits were reported in the period.
RxT	Pharmacotherapy reported during the period (may also include OP or SH).
Antidepressants	Use of antidepressants >14 days in period. Antidepressants include Paxil, Effexor, Fluoxetine, Celexa, Lexapro, Zoloft, Serzone, Wellbutrin, and/or Unspecified Antidepressant. *(Continued on next page)*

Appendix Table A.2. Variable Definitions (Continued)

Variable	Detail
State Variables	
# of periods employed <90% of period	Number of periods employed less than 90% of period
# of periods employed part-time >90% of period	Number of periods employed part-time for greater than 90% of period, <35 hours per week
# of periods employed full-time >90% of period	Number of periods employed full-time for greater than 90% of period, ≥ 35 hours per week
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# Periods Non-Problem Drinking Only	Number of periods with drinking reported, but no Problem Drinking days.
# Periods Problem Drinking <50% of Period	Number of periods where at least one problem drinking week occurred but not more than 50% of the period were problem drinking weeks.
# Periods Problem Drinking >50% of Period	Number of periods where more than 50% of the period were problem drinking weeks.
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# Periods Since Pharmacotherapy for Alcohol Use	Number of periods since period with pharmacotherapy for alcohol use
# Periods Since Outpatient Therapy (No RxT)	Number of periods since period with outpatient therapy (where no RxT was reported)
# Periods Since Self-help Visits for Alcohol Use	Number of periods since period with self-help visit for alcohol use
# Periods Antidepressants	Number of periods with antidepressant use

Notes: Employment, Self-help visits and Outpatient Counseling visits were reported in the aggregate for the entire period. Drinking and pharmacotherapies were reported for each day in the period.

Appendix Table A.3. Sample Summary Statistics at Time of Enrollment in COMBINE Trial

Variable	Mean (Std. Dev.)
N	775
Female	.302 (.459)
Age	44.9 (10.4)
Black	.106 (.308)
Other Race	.046 (.211)
Married of Living with Partner[a]	.455 (.498)
Divorced, Separated, or Widowed[a]	.250 (.433)
High School Degree[a]	.526 (.500)
Undergraduate Degree[a]	.200 (.400)
Graduate Degree[a]	.206 (.405)

Notes: a. Although marriage and education are collected over time, less than 1% of the sample reports any changes in them.

Appendix Table A.4. Employment Proportions (St. Err.): By Time Period and Aggregated for Full Analysis Sample[a]

Variable	Time									Proportion of Individuals in Employment Category During One or More Periods		Proportion of Individuals Who Remain in Employment Category During All Periods
	1	2[b]	3	4	5	6	7	8	9	All Periods	Periods 3-9[c]	Periods 3-9[c]
N	775	775	775	775	775	745	704	650	570	5769	4994	4994
Not Employed	.124 (.012)	.159 (.013)	.132 (.012)	.170 (.014)	.178 (.014)	.173 (.014)	.169 (.014)	.172 (.015)	.207 (.017)	.361 (.020)	.332 (.020)	.080 (.017)
Employed Less Than 90% of Period	.321 (.017)	.164 (.013)	.223 (.015)	.169 (.013)	.163 (.013)	.177 (.014)	.168 (.014)	.148 (.014)	.139 (.014)	.609 (.020)	.496 (.021)	.009 (.018)
Employed Part Time > 90% of Period	.119 (.012)	.135 (.012)	.119 (.012)	.120 (.012)	.124 (.012)	.128 (.012)	.128 (.013)	.132 (.013)	.121 (.014)	.351 (.020)	.302 (.019)	.023 (.017)
Employed Full Time > 90% of Period	.502 (.018)	.542 (.018)	.526 (.018)	.541 (.018)	.535 (.018)	.522 (.018)	.536 (.019)	.548 (.020)	.533 (.021)	.772 (.018)	.753 (.018)	.292 (.016)

Notes: a. Sample includes individuals who did not complete all interview waves. b. Time period 2 covers from study randomization through the end of COMBINE study treatment. c. Represents outcomes of individuals during the period after the COMBINE treatment ended.

Appendix Table A.5. Proportions and Conditional Proportions of Period (St. Err) of Drinking Outcomes: By Time and Aggregated for Full Analysis Sample[a]

	Time									Proportion of Individuals in Drinking Category During One or More Periods	
Variable	1	2[b]	3	4	5	6	7	8	9	All Periods	Periods 3-9[c]
N	775	775	775	775	775	745	704	650	570	6544	4994
Abstinent	0.000 (0.000)	0.210 (0.015)	0.205 (0.015)	0.248 (0.016)	0.271 (0.016)	0.277 (0.016)	0.320 (0.018)	0.332 (0.018)	0.353 (0.020)	0.508 (0.018)	0.479 (0.018)
Non-Problem Drinking Only	0.000 (0.000)	0.105 (0.011)	0.084 (0.010)	0.099 (0.011)	0.097 (0.011)	0.086 (0.010)	0.099 (0.011)	0.103 (0.012)	0.104 (0.013)	0.293 (0.016)	0.261 (0.016)
Problem Drinking Less than 50% of Period	0.232 (0.015)	0.316 (0.017)	0.283 (0.016)	0.213 (0.015)	0.204 (0.014)	0.217 (0.015)	0.188 (0.015)	0.198 (0.016)	0.196 (0.017)	0.719 (0.016)	0.579 (0.018)
Problem Drinking More than 50% of Period	0.768 (0.015)	0.369 (0.017)	0.428 (0.018)	0.440 (0.018)	0.428 (0.018)	0.420 (0.018)	0.393 (0.018)	0.366 (0.019)	0.347 (0.020)	0.863 (0.012)	0.634 (0.017)

Notes: a. Sample includes individuals who did not complete all interview waves. b. Time period 2 covers from study randomization through the end of COMBINE study treatment. c. Represents drinking outcomes of individuals during the period after the COMBINE treatment ended.

Appendix Table A.6. Proportions (St. Err) of Self-help (SH), Outpatient Counseling (OPC) and Pharmacotherapy (RxT) to Support Recovery: By Time and Aggregated for Full Analysis Sample[a]

	Time									Proportion of Individuals in Treatment Category During One or More Periods	
Variable	1	2[b]	3	4	5	6	7	8	9	All Periods	Periods 3-9[c]
N	775	775	775	775	775	745	704	650	570	6544	4994
SH Visits (>7 in Period)	.067 (.009)	.195 (.014)	.239 (.015)	.206 (.015)	.221 (.015)	.221 (.015)	.227 (.016)	.234 (.017)	.235 (.018)	.414 (.018)	.385 (.017)
Outpatient Therapy (>3 in Period)	.058 (.008)	.552 (.018)	.106 (.011)	.075 (.009)	.092 (.010)	.089 (.010)	.074 (.010)	.077 (.010)	.091 (.012)	.662 (.017)	.283 (.016)
RxT[d] (>14 days of Period)	.012 (.004)	.665 (.017)	.089 (.010)	.077 (.010)	.089 (.010)	.083 (.010)	.080 (.010)	.097 (.012)	.096 (.012)	.703 (.016)	.182 (.014)
No Treatment	.876 (.012)	.174 (.014)	.661 (.017)	.712 (.016)	.693 (.017)	.687 (.017)	.693 (.017)	.671 (.018)	.654 (.020)	.957 (.007)	.863 (.012)
SH Visits	.061 (.009)	.026 (.006)	.170 (.014)	.164 (.013)	.156 (.013)	.170 (.014)	.180 (.015)	.177 (.015)	.182 (.016)	.355 (.017)	.337 (.017)
Outpatient Therapy (No RxT)	.058 (.008)	.262 (.016)	.092 (.010)	.065 (.009)	.074 (.009)	.070 (.009)	.061 (.009)	.066 (.010)	.077 (.011)	.465 (.018)	.254 (.016)
RxT	.005 (.003)	.538 (.018)	.077 (.010)	.059 (.008)	.077 (.010)	.072 (.010)	.065 (.009)	.086 (.011)	.086 (.012)	.591 (.018)	.161 (.013)

Notes: a. Sample includes individuals who did not complete all interview waves. b. Time period 2 covers from study randomization through the end of COMBINE study treatment. Note consumption of outpatient therapy and Rxt was therefore higher than in any other period. c. Represents self-sought treatment of individuals during the period after COMBINE treatment ended. d. Includes Naltrexone, Acamprosate, Disulfiram, Quetiapine, Topiramate, Gabapentin and Neurontin when prescribed for alcohol use.

Appendix Table A.7. Use of Antidepressant (St. Err.): By Time Period and Aggregated for Full Analysis Sample[a]

	Time									Proportion of Individuals with any antidepressant use During One or More Periods	
Variable	1	2[b]	3	4	5	6	7	8	9	All Periods	Periods 3-9[c]
N	775	775	775	775	775	745	704	650	570	5769	4994
Any use of Antidepressants	.048 (.008)	.063 (.009)	.114 (.011)	.138 (.012)	.165 (.013)	.168 (.014)	.186 (.015)	.182 (.015)	.184 (.016)	.293 (.006)	.233 (.005)

Notes: a. Sample includes individuals who did not complete all interview waves. b. Time period 2 covers from study randomization through the end of COMBINE study treatment. c. Represents outcomes of individuals during the period after the COMBINE treatment ended.

Appendix Table A.8. Transition Probabilities in Primary Outcome Categories within Individuals of Over Time[a]

Outcome Category in Period *t (%)*	Proportion of Individuals in Outcome Category in Period *t* + 1 Conditional on Category in Period *t*			
	Not Employed	Employed Less Than 90% of Period	Employed Part Time > 90% of Period	Employed Full Time > 90% of Period
Not Employed (16.4)	0.771	0.163	0.033	0.033
Employed Less Than 90% of Period (17.4)	0.168	0.393	0.141	0.298
Employed Part Time > 90% of Period (12.6)	0.051	0.175	0.590	0.184
Employed Full Time > 90% of Period (53.5)	0.015	0.102	0.038	0.845
	Abstinent	Non-Problem Drinking Only	Problem Drinking, Less than 50% of Period	Problem Drinking, More than 50% of Period
Abstinent (26.4)	0.813	0.057	0.128	0.002
Non-Problem Drinking Only (9.6)	0.153	0.504	0.305	0.038
Problem Drinking, Less than 50% of Period (23.3)	0.143	0.073	0.560	0.223
Problem Drinking, More than 50% of Period (40.8)	0.008	0.018	0.271	0.703
	No Treatment Modality	Self Help Visits	Outpatient Therapy (No RxT)	RxT
No Treatment Modality (59.5)	0.895	0.049	0.038	0.018
Self Help Visits (14.5)	0.195	0.711	0.075	0.019
Outpatient Therapy (No RxT) (8.7)	0.445	0.194	0.299	0.062
RxT (8.2)	0.447	0.124	0.055	0.374

Notes: a. The sample is 775 individuals. Calculations are based on 4,994 observations. The *t* periods are 1 through 7; *t* + 1 are 2 through 8. b. Problem drinking includes either a week in which a Problem Drinking day occurred (5+ drinks for men, 4+ for woman) or a week in which 14 or more drinks were consumed.

Appendix Table A.9. Means and Std. Dev. Of Model Covariates, State Variables and Exclusion Restrictions

	Mean	Std. Dev.
Per Period Time Varying Covariates, All Equations		
Construction Wage (Weekly Income/40)	10.058	1.417
Manufacturing Wage (Weekly Income/40)	24.285	4.507
Price of Fluoxetine	16.254	4.844
Price of Naltrexone	93.869	15.100
Price of Beer	8.419	0.834
((Average # of Unused OP Sessions)/ (# People receiving or claiming to need specialty treatment for AUDS))*1000	91.608	13.334
Price of Gasoline	2.409	1.233
Average Home Price/100,000	1.938	0.352
Non-Labor Income/1000	2.029	1.038
Length of Period in Months	4.264	1.714
Periods Since Randomization	4.815	2.787
Per Period Time Invariant Covariates		
Female	0.302	0.459
Age	44.909	10.394
Age x Female	13.760	21.605
Married of Living with Partner	0.455	0.498
Education	14.160	2.595
Per Period State Variables		
# Periods employed <90% of period	0.842	1.220
# Periods employed part-time >90% of period	2.274	2.313
# Periods employed full-time >90% of period	0.532	1.230
# Periods Non-problem Drinking Only	0.302	0.837
# Periods Problem Drinking <50% of Period	2.132	2.241
# Periods Problem Drinking >50% of Period	1.559	2.149
# Periods Since Pharmacotherapy for Alcohol Use	2.699	2.367

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Appendix Table A.9 (Continued). Means and Std. Dev. Of Model Covariates, State Variables and Exclusion Restrictions

	Mean	Std. Dev.
# Periods Since Outpatient Therapy (No Rx Therapy)	2.954	2.446
# Periods Since Self-help Visits for Alcohol Use	2.944	2.555
# Periods Antidepressants	0.459	1.191
Manufacturing Wage	6.528	1.023
Construction Wage	9.791	1.231
Retail Wage	22.759	4.033
((Average # of Unused OP Sessions x Sliding Scale Fee/ (# People receiving or claiming to need specialty treatment for AUDS))*1000	23.470	4.286
Indicator of Parent with AUD	0.680	0.517
Female x Indicator of Parent with AUD	0.228	0.420
Age x Indicator of Parent with AUD	33.800	20.860
Indicator of Parent with AUD x Average Home Price	1.571	1.292

Note: All prices are in 2008 dollars.

Appendix B

Appendix Table B.1. Estimates for Per Period Employment Status

	Multinomial Logit v. Not employed					
	Employed < 90% of Period		Employed Part Time > 90% of Period		Employed Full Time > 90% of Period	
	Estimate	St.Err.	Estimate	St.Err.	Estimate	St.Err.
# Periods Employed <90% of Period	0.726***	(0.067)	0.884***	(0.097)	0.798***	(0.078)
# Periods Employed Part-time >90% of Period	0.783***	(0.058)	0.990***	(0.081)	1.556***	(0.064)
# Periods Employed Full-time >90% of Period	0.800***	(0.078)	1.614***	(0.121)	0.966***	(0.086)
# Periods Non-Problem Drinking Only	0.121	(0.109)	0.002	(0.130)	0.052	(0.112)
# Periods Problem Drinking <50% of Period	-0.120*	(0.071)	-0.300***	(0.089)	-0.356***	(0.074)
# Periods Problem Drinking >50% of Period	-0.008	(0.066)	-0.131*	(0.081)	-0.196***	(0.068)
# Periods Since Pharmacotherapy for Alcohol Use	-0.062	(0.092)	-0.102	(0.113)	-0.074	(0.094)
# Periods Since Outpatient Therapy (No RxT)	-0.033	(0.118)	-0.013	(0.148)	-0.230*	(0.123)
# Periods Since Self-help Visits for Alcohol Use	-0.100	(0.063)	-0.068	(0.085)	-0.108	(0.067)
# Periods Antidepressants	-0.024	(0.066)	0.035	(0.082)	0.012	(0.069)
Construction Wage	-0.003	(0.169)	0.070	(0.204)	-0.162	(0.173)
Manufacturing Wage	0.168	(0.181)	0.235	(0.221)	0.200	(0.185)
Price Fluoxetine	-0.002	(0.003)	-0.007**	(0.003)	-0.006**	(0.003)
Price	0.002	(0.010)	-0.004	(0.012)	0.005	(0.010)
Price of Beer	0.029	(0.142)	0.099	(0.177)	0.167	(0.144)
Average # of Unused OP Sessions	-0.009	(0.008)	-0.013	(0.010)	-0.012	(0.008)
Price of Gasoline	-0.129	(0.331)	0.059	(0.428)	-0.076	(0.351)
Average Home Price	0.040	(0.079)	0.184*	(0.091)	0.140	(0.079)
Non-Labor Income/1000	-0.160***	(0.020)	-0.242***	(0.024)	-0.351***	(0.019)
Female	-1.468**	(0.689)	0.841	(0.819)	0.420	(0.696)
Age	-0.394***	(0.092)	0.147	(0.113)	-0.093	(0.092)
Age x Female	0.745**	(0.315)	-0.278	(0.374)	-0.234	(0.324)
Married or Living With Partner	-0.401**	(0.149)	-0.201	(0.185)	-0.305*	(0.152)
Years of Education	0.010	(0.082)	0.058	(0.102)	0.204**	(0.083)
Length of Period in Months	-2.607***	(0.351)	-3.850***	(0.462)	-4.036***	(0.372)
Periods Since Randomization	1.010***	(0.241)	0.273	(0.305)	0.514*	(0.242)
Center 2	0.290	(0.453)	0.288	(0.545)	0.441	(0.463)
Center 3	0.023	(0.618)	0.334	(0.717)	0.373	(0.636)
Center 4	-0.628	(0.505)	-0.373	(0.614)	-0.692	(0.520)
Center 5	-0.501	(0.336)	-0.377	(0.421)	-0.298	(0.340)
Center 6	0.660	(0.397)	0.486	(0.490)	0.641	(0.427)
Center 7	-0.032	(0.653)	-0.777	(0.768)	0.196	(0.661)
Center 8	-0.540	(0.632)	-0.433	(0.726)	-0.130	(0.641)
Acam + MM	0.056	(0.293)	0.528	(0.353)	0.166	(0.297)
Nalt + MM	-0.329	(0.301)	-0.160	(0.377)	-0.446	(0.304)
Acam + Nalt + MM	-0.241	(0.297)	-0.514	(0.389)	-0.385	(0.303)
MM + CBI	0.130	(0.321)	0.106	(0.417)	0.299	(0.334)
Acam + MM + CBI	-0.262	(0.288)	-0.364	(0.362)	-0.204	(0.290)
Nalt + MM + CBI	-0.114	(0.304)	0.284	(0.368)	0.129	(0.301)
Acam + Nalt + MM + CBI	0.471	(0.321)	0.365	(0.434)	0.771*	(0.322)
CBI Only	-0.104	(0.306)	-0.073	(0.394)	0.145	(0.320)
Constant	10.372***	(1.971)	18.720***	(2.538)	22.037***	(2.047)

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Appendix Table B.1 (continued). Estimates for Per Period Employment Status

	Multinomial Logit v. Not employed					
	Employed < 90% of Period		Employed Part Time > 90% of Period		Employed Full Time > 90% of Period	
Points of Support	Estimate	St.Err.	Estimate	St.Err.	Estimate	St.Err.
Permanent UH						
1.000	Normalized to 0		Normalized to 0		Normalized to 0	
2.000	-0.148	(0.455)	0.468	(0.488)	0.850*	(0.748)
3.000	-0.203	(0.322)	0.317	(0.376)	0.980***	(0.328)
4.000	0.269	(0.359)	-0.077	(0.428)	0.621	(0.389)
5.000	-1.327***	(0.365)	-1.479***	(0.469)	-0.704*	(0.367)
6.000	-0.413	(0.296)	-0.732**	(0.360)	-0.210	(0.314)
7.000	-0.291	(0.505)	0.222	(0.576)	0.478	(0.513)
Time Varying UH						
1.000	Normalized to 0		Normalized to 0		Normalized to 0	
2.000	1.401	(0.487)	-1.945	(0.314)	-2.344***	(0.581)
3.000	2.118***	(0.788)	5.600***	(0.514)	0.766	(0.808)
4.000	2.229***	(0.748)	6.382***	(0.467)	1.339*	(0.772)
5.000	0.167	(0.328)	4.119***	(0.788)	0.063	(0.317)

Notes: ***indicates significance at 1%, **5%, and *10%. Indicators for quarter of interview, study location, and year of entering the study are not reported. Estimates are for time periods 2-8, after the end of the COMBINE treatment. Estimated jointly with employment, alcohol use, treatment and self-help visits, wages, attrition, and initial condition equations.

Appendix Table B.2. Log Wages Conditional on Any Employment

	Estimate	Standard Error
# Periods Employed <90% of Period	0.031***	(0.007)
# Periods Employed Part-time >90% of Period	0.052***	(0.006)
# Periods Employed Full-time >90% of Period	0.073***	(0.006)
# Periods Non-Problem Drinking Only	-0.041***	(0.006)
# Periods Problem Drinking <50% of Period	-0.041***	(0.004)
# Periods Problem Drinking >50% of Period	0.026	(0.004)
# Periods Since Pharmacotherapy for Alcohol Use	0.001	(0.005)
# Periods Since Outpatient Therapy (No RxT)	-0.021***	(0.007)
# Periods Since SH Visits for Alcohol Use	-0.022***	(0.005)
# Periods Antidepressants	-0.020**	(0.004)
Construction Wage	-0.005	(0.010)
Manufacturing Wage	0.041***	(0.009)
Female	-0.201***	(0.028)
Age	0.099***	(0.032)
Age x Female	-0.019	(0.022)
Married or Living With Partner	0.099***	(0.018)
Years of Education	0.222***	(0.023)
Length of Period in Months	-0.094***	(0.040)
Periods Since Randomization	0.003	(0.034)
Center 2	0.158***	(0.019)
Center 3	-0.153***	(0.021)
Center 4	-0.295***	(0.021)
Center 5	0.121	(0.023)
Center 6	-0.228***	(0.021)
Center 7	-0.106	(0.021)
Center 8	-0.023	(0.021)
Acam + MM	-0.004	(0.029)
Nalt + MM	-0.109	(0.024)
Acam + Nalt + MM	-0.063***	(0.022)
MM + CBI	-0.139***	(0.018)
Acam + MM + CBI	-0.011	(0.020)
Nalt + MM + CBI	-0.069***	(0.026)
Acam + Nalt + MM + CBI	-0.065***	(0.020)
CBI Only	-0.138***	(0.021)
Constant	2.317***	(0.033)

Appendix Table B.2 (Continued). Log Wages Conditional on Any Employment

Points of Support	Estimate	Standard Error
Permanent UH		
1	Normalized to 0	
2	1.257***	(0.022)
3	0.911***	(0.018)
4	0.579***	(0.019)
5	1.266***	(0.026)
6	0.470***	(0.020)
7	1.655***	(0.021)
Time Varying UH		
1	Normalized to 0	
2	0.016	(0.033)
3	-1.207***	(0.031)
4	1.219***	(0.044)
5	0.087***	(0.039)

Notes:***indicates significance at 1%, **5%, and *10%. Indicators for quarter of interview, study location, and year of entering the study are not reported. Estimates are for time periods 2-8, after end of COMBINE Treatment. Estimated jointly with employment, alcohol use, treatment and SH visits, wages, attrition, and initial condition equations.

Appendix Table B.3. Estimates for Per Period Antidepressant Use

	Logit v. No Antidepressant Use	
	Antidepressant Use	
	Estimate	St.Err.
# Periods Employed <90% of Period	-0.190**	(0.077)
# Periods Employed Part-time >90% of Period	-0.042	(0.048)
# Periods Employed Full-time >90% of Period	-0.025	(0.068)
# Periods Non-Problem Drinking Only	-0.156	(0.106)
# Periods Problem Drinking <50% of Period	0.186***	(0.069)
# Periods Problem Drinking >50% of Period	0.123**	(0.058)
# Periods Since Pharmacotherapy for Alcohol Use	0.441***	(0.077)
# Periods Since Outpatient Therapy (No RxT)	0.327***	(0.104)
# Periods Since Self-help Visits for Alcohol Use	-0.102	(0.072)
# of Period of Antidepressants	2.825***	(0.109)
Construction Wage	0.360**	(0.172)
Manufacturing Wage	-0.285	(0.187)
Price Fluoxetine	-0.005*	(0.003)
Price Naltrexone	-0.005	(0.010)
Price of Beer	0.534***	(0.183)
Average # of Unused OP Sessions	-0.002	(0.008)
Price of Gasoline	0.040	(0.309)
Average Home Price	-0.040	(0.072)
Non-Labor Income/1000	0.064***	(0.019)
Female	1.956**	(0.784)
Age	-0.113	(0.101)
Age x Female	-0.588	(0.368)
Married or Living With Partner	0.292**	(0.147)
Education	0.177**	(0.075)
Length of Period in Months	-1.101***	(0.361)
Periods Since Randomization	0.552**	(0.230)
Center 2	0.221	(0.396)
Center 3	-1.004*	(0.602)
Center 4	-1.309**	(0.634)
Center 5	0.494	(0.324)
Center 6	0.192	(0.385)
Center 7	-1.171*	(0.622)
Center 8	-0.440	(0.586)
Acam + MM	0.021	(0.342)
Nalt + MM	0.051	(0.353)
Acam + Nalt + MM	-0.167	(0.367)
MM + CBI	0.047	(0.354)
Acam + MM + CBI	-0.107	(0.342)
Nalt + MM + CBI	0.044	(0.337)
Acam + Nalt + MM + CBI	0.503	(0.332)
CBI Only	-0.147	(0.352)
Constant	-17.118***	(2.793)

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Appendix Table B.3 (Continued). Estimates for Per Period Antidepressant Use

	Logit v. No Antidepressant Use	
	Antidepressant Use	
Points of Support	Estimate	St.Err.
Permanent UH		
1		
2	0.759**	(0.348)
3	0.648	(0.280)
4	0.110	(0.326)
5	1.095**	(0.358)
6	1.867***	(0.297)
7	0.567	(0.349)
Time Varying UH		
1		
2	8.253***	(0.841)
3	11.342***	(0.797)
4	13.349***	(0.804)
5	11.340***	(0.705)

Notes: ***indicates significance at 1%, **5%, and *10%. Indicators for quarter of interview, study location, and year of entering the study are not reported. Estimates are for time periods 2-8, after the end of COMBINE treatment. Estimated jointly with employment, alcohol use, treatment and self-help visits, wages, attrition, and initial condition equations.

Appendix Table B.4. Estimates for Per Period Treatment or Self-Help Visits for Alcohol Use

	Multinomial Logit v. No Treatment or SH Visits					
	Self Help Visits		Outpatient Therapy (No RxT)		RxT	
	Estimate	St.Err.	Estimate	St.Err.	Estimate	St.Err.
# Periods Employed <90% of Period	-0.199***	(0.063)	-0.231***	(0.085)	-0.031	(0.096)
# Periods Employed Part-time >90% of Period	-0.061	(0.043)	-0.056	(0.053)	-0.130*	(0.068)
# Periods Employed Full-time >90% of Period	-0.040	(0.061)	-0.019	(0.076)	-0.035	(0.087)
# Periods Non-Problem Drinking Only	-0.379***	(0.105)	-0.090	(0.111)	0.081	(0.135)
# Periods Problem Drinking <50% of Period	0.109*	(0.058)	0.313***	(0.077)	0.500***	(0.101)
# Periods Problem Drinking >50% of Period	0.109***	(0.048)	0.206***	(0.068)	0.354***	(0.087)
# Periods Since Pharmacotherapy for Alcohol Use	0.685***	(0.103)	0.781***	(0.117)	2.274***	(0.117)
# Periods Since Outpatient Therapy (No RxT)	1.004***	(0.088)	1.414***	(0.094)	1.018***	(0.129)
# Periods Since Self-help Visits for Alcohol Use	1.471***	(0.062)	1.004***	(0.085)	0.709***	(0.116)
# of Period of Antidepressants	0.040	(0.055)	0.239***	(0.060)	0.075	(0.074)
Construction Wage	-0.070	(0.141)	0.016	(0.176)	0.274	(0.194)
Manufacturing Wage	0.107	(0.146)	0.438**	(0.196)	-0.023	(0.217)
Price Fluoxetine	0.000	(0.002)	-0.002	(0.003)	-0.002	(0.003)
Price Naltrexone	0.002	(0.008)	-0.017	(0.011)	0.052***	(0.014)
Price of Beer	0.093	(0.120)	0.526***	(0.166)	0.195	(0.199)
Average # of Unused OP Sessions	0.002	(0.006)	0.002	(0.008)	-0.009	(0.009)
Price of Gasoline	0.094	(0.255)	0.374	(0.322)	0.328	(0.398)
Average Home Price	0.104*	(0.058)	0.194***	(0.071)	-0.004	(0.092)
Non-Labor Income/1000	0.034**	(0.017)	0.063***	(0.022)	-0.060**	(0.028)
Female	-0.665	(0.807)	-0.515	(0.855)	1.786**	(0.884)
Age	-0.021	(0.079)	-0.147	(0.110)	0.335***	(0.118)
Age x Female	0.167	(0.374)	0.318	(0.395)	-0.747*	(0.407)
Married or Living With Partner	-0.020	(0.121)	0.193	(0.161)	0.034	(0.176)
Years of Education	-0.134**	(0.067)	-0.013	(0.089)	0.048	(0.094)
Length of Period in Months	-2.133***	(0.291)	-2.924***	(0.397)	-3.228***	(0.477)
Periods Since Randomization	0.639***	(0.182)	0.972***	(0.240)	1.050***	(0.295)
Center 2	0.085	(0.303)	-0.047	(0.357)	-0.629	(0.454)
Center 3	-0.047	(0.541)	0.248	(0.622)	-2.907***	(0.674)
Center 4	-0.549	(0.441)	-1.194**	(0.562)	-2.913***	(0.670)
Center 5	-0.052	(0.259)	-0.247	(0.335)	-0.439	(0.358)
Center 6	0.292	(0.334)	-0.449	(0.431)	-0.821	(0.477)
Center 7	-0.531	(0.564)	-1.274**	(0.648)	-2.507***	(0.695)
Center 8	-0.090	(0.533)	-0.544	(0.610)	-2.599***	(0.613)
Acam + MM	-0.677**	(0.296)	-0.733**	(0.356)	-2.179***	(0.340)
Nalt + MM	0.107	(0.290)	-0.765**	(0.377)	-1.883***	(0.342)
Acam + Nalt + MM	-0.236	(0.293)	-0.578	(0.367)	-2.398***	(0.380)
MM + CBI	-0.883***	(0.287)	-1.735***	(0.366)	-1.811***	(0.387)
Acam + MM + CBI	-0.383	(0.286)	-0.673**	(0.342)	-3.208***	(0.419)
Nalt + MM + CBI	-0.985***	(0.309)	-0.885***	(0.339)	-2.175***	(0.330)
Acam + Nalt + MM + CBI	-1.020***	(0.304)	-0.768	(0.329)	-2.885***	(0.390)
CBI Only	-0.693**	(0.282)	-1.260***	(0.332)	-2.043***	(0.407)
Constant	4.550**	(1.787)	0.945	(2.137)	-3.472	(2.844)

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Appendix Table B.4. (Continued) Estimates for Per Period Treatment or Self-Help Visits for Alcohol Use

	Multinomial Logit v. No Treatment or SH Visits					
	Self Help Visits		Outpatient Therapy (No RxT)		RxT	
	Estimate	St.Err.	Estimate	St.Err.	Estimate	St.Err.
Permanent UH						
1	Normalized to 0					
2	0.863***	(0.325)	0.491	(0.318)	-0.577	(0.508)
3	1.149***	(0.246)	0.999**	(0.479)	-0.185	(0.385)
4	0.911***	(0.273)	0.553	(0.421)	0.353	(0.727)
5	1.273***	(0.278)	0.989	(0.346)	0.545	(0.559)
6	2.096***	(0.259)	1.274***	(0.429)	0.946*	(0.557)
7	0.322	(0.281)	-0.218	(0.520)	-5.268***	(0.761)
Time Varying UH						
1	Normalized to 0					
2	0.723**	(0.366)	2.425***	(0.367)	7.614***	(1.039)
3	1.047***	(0.328)	1.488***	(0.430)	6.892***	(0.809)
4	2.747***	(0.462)	6.191***	(0.694)	9.807***	(0.972)
5	1.187***	(0.472)	2.020***	(0.567)	6.420***	(0.688)

Notes: ***indicates significance at 1%, **5%, and *10%. Indicators for quarter of interview, study location, and year of entering the study are not reported. Estimates are for time periods 2-8, after the end of COMBINE treatment. Estimated jointly with employment, alcohol use, treatment and self-help visits, wages, attrition, and initial condition equations.

Appendix Table B.5. Estimates of Per Period Alcohol Use

	Multinomial Logit v. Abstinent					
	Non-Problem Drinking Only		Problem Drinking Less than 50% of Period		Problem Drinking More than 50% of Period	
	Estimate	St.Err.	Estimate	St.Err.	Estimate	St.Err.
# Periods Employed <90% of Period	-0.043	(0.084)	-0.101	(0.068)	-0.204***	(0.077)
# Periods Employed Part-time >90% of Period	-0.007	(0.051)	-0.042	(0.046)	-0.067	(0.051)
# Periods Employed Full-time >90% of Period	-0.098	(0.073)	-0.031	(0.062)	-0.094	(0.068)
# Periods Non-Problem Drinking Only	1.366***	(0.086)	1.037***	(0.090)	0.650***	(0.111)
# Periods Problem Drinking <50% of Period	0.765***	(0.072)	1.204***	(0.064)	1.048***	(0.071)
# Periods Problem Drinking >50% of Period	0.647***	(0.068)	1.061***	(0.060)	1.641***	(0.063)
# Periods Since Pharmacotherapy for Alcohol Use	-0.381***	(0.095)	-0.284***	(0.074)	-0.412***	(0.082)
# Periods Since Outpatient Therapy (No RxT)	-0.173	(0.103)	-0.267***	(0.090)	-0.441***	(0.100)
# Periods Since Self-help Visits for Alcohol Use	-0.353***	(0.070)	-.0219***	(0.051)	-0.491***	(0.067)
# Periods Antidepressants	-0.051	(0.068)	-0.017	(0.056)	0.005	(0.062)
Construction Wage	0.287*	(0.170)	0.102	(0.149)	0.110	(0.154)
Manufacturing Wage	-0.058	(0.200)	-0.112	(0.166)	-0.120	(0.171)
Price Fluoxetine	-0.002	(0.003)	-0.005**	(0.002)	-0.004**	(0.002)
Price Naltrexone	-0.011	(0.010)	0.005	(0.008)	0.009	(0.008)
Price of Beer	0.112	(0.161)	-0.055	(0.122)	-0.029	(0.129)
Average # of Unused OP Sessions	0.005	(0.008)	0.001	(0.006)	0.009	(0.006)
Price of Gasoline	-0.501	(0.339)	-0.771***	(0.289)	-0.803***	(0.300)
Average Home Price	-0.016	(0.073)	0.048	(0.063)	0.037	(0.065)
Non-Labor Income/1000	0.022	(0.023)	-0.007	(0.019)	-0.010	(0.019)
Female	0.132	(0.778)	-0.195	(0.624)	-0.403	(0.695)
Age	0.142	(0.099)	-0.052	(0.083)	0.009	(0.089)
Age x Female	0.091	(0.348)	0.232	(0.290)	0.257	(0.321)
Married or Living With Partner	0.288*	(0.153)	-0.036	(0.128)	-0.037	(0.140)
Years of Education	0.174**	(0.082)	-0.023	(0.072)	0.060	(0.078)
Length of Period in Months	-2.313***	(0.361)	-3.357***	(0.322)	-4.190***	(0.357)
Periods Since Randomization	0.599**	(0.233)	1.232***	(0.191)	0.780***	(0.191)
Center 2	-0.104	(0.419)	-0.295	(0.363)	-0.140	(0.375)
Center 3	-0.525	(0.600)	-0.836	(0.555)	-0.442	(0.557)
Center 4	-0.169	(0.524)	-0.243	(0.445)	-0.150	(0.455)
Center 5	0.047	(0.332)	-0.078	(0.274)	0.036	(0.290)
Center 6	0.533	(0.411)	-0.319	(0.375)	0.462	(0.391)
Center 7	-0.808	(0.641)	-0.286	(0.585)	-0.072	(0.612)
Center 8	-0.429	(0.578)	-1.116**	(0.554)	-0.668	(0.555)
Acam + MM	0.276	(0.345)	-0.046	(0.278)	0.323	(0.297)
Nalt + MM	0.113	(0.369)	0.458	(0.280)	0.442	(0.314)
Acam + Nalt + MM	-0.006	(0.352)	0.099	(0.281)	0.176	(0.313)
MM + CBI	0.099	(0.378)	0.185	(0.294)	0.624**	(0.312)
Acam + MM + CBI	0.442	(0.348)	0.482*	(0.275)	0.621**	(0.309)
Nalt + MM + CBI	0.558	(0.356)	0.372	(0.278)	0.743***	(0.302)
Acam + Nalt + MM + CBI	0.344	(0.358)	0.178	(0.293)	0.539*	(0.327)
CBI Only	0.079	(0.390)	0.355	(0.292)	0.660**	(0.321)
Constant	7.688***	(2.437)	13.926***	(1.962)	20.304***	(2.185)

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Appendix Table B.5. (Continued) Estimates for Per Period Alcohol Use

	Multinomial Logit v. Abstinent					
	Non-Problem Drinking Only		Problem Drinking Less than 50% of Period		Problem Drinking More than 50% of Period	
	Estimate	St.Err.	Estimate	St.Err.	Estimate	St.Err.
Permanent UH						
1	Normalized to 0					
2	-0.320	(0.498)	-0.074	(0.333)	-0.364	(0.711)
3	-0.141	(0.323)	-0.005	(0.297)	-0.738**	(0.361)
4	-0.383	(0.346)	-0.184	(0.386)	0.028	(1.159)
5	0.392	(0.374)	0.169	(0.241)	-0.086	(0.513)
6	-0.462	(0.511)	0.258	(0.328)	-0.735	(0.493)
7	-1.147***	(0.376)	0.415	(0.310)	-0.653**	(0.318)
Time Varying UH						
1	Normalized to 0					
2	-0.605	(0.398)	-0.047	(0.327)	-0.253	(1.225)
3	-0.748***	(0.245)	-0.311	(0.295)	-0.665	(0.538)
4	0.977***	(0.268)	2.496	(1.178)	-0.428	(0.520)
5	-0.721**	(0.316)	0.647	(0.750)	0.230	(0.324)

Notes: ***indicates significance at 1%, **5%, and *10%. Indicators for quarter of interview, study location, and year of entering the study are not reported. Estimates are for time periods 2-8, after the end of COMBINE treatment. Estimated jointly with employment, alcohol use, treatment and self-help visits, wages, attrition, and initial condition equations.

Appendix Table B.6. Estimate for Per Period Attrition

	Logit v. Still in Study	
	Left Study	
	Estimate	St.Err.
# Periods Employed <90% of Period	-0.495	(1.451)
# Periods Employed Part-time >90% of Period	-0.374	(4.387)
# Periods Employed Full-time >90% of Period	-0.142	(4.491)
# Periods Non-Problem Drinking Only	0.179	(3.767)
# Periods Problem Drinking <50% of Period	-0.400	(6.026)
# Periods Problem Drinking >50% of Period	-0.063	(1.271)
# Periods Since Pharmacotherapy for Alcohol Use	0.133	(0.461)
# Periods Since Outpatient Therapy (No RxT)	0.468	(9.014)
# Periods Since Self-help Visits for Alcohol Use	0.070	(1.080)
# of Period of Antidepressants	0.095	(1.372)
Construction Wage	0.616	(2.145)
Manufacturing Wage	1.705	(8.882)
Price Fluoxetine	-15.41	(1.034)
Price Naltrexone	-0.708	(0.424)
Price of Beer	7.059	(7.949)
Average # of Unused OP Sessions	1.047	(4.342)
Price of Gasoline	-3.448	(6.341)
Average Home Price	3.346	(4.572)
Non-Labor Income/1000	-0.146	(2.483)
Female	0.375	(1.629)
Age	0.056	(8.245)
Age x Female	0.138	(9.683)
Married or Living With Partner	-0.559	(9.415)
Years of Education	-0.336	(6.977)
Length of Period in Months	2.585	(4.096)
Periods Since Randomization	3.569	(2.260)
Center 2	0.183	(1.006)
Center 3	-2.270	(7.435)
Center 4	-2.979	(8.647)
Center 5	1.922	(1.093)
Center 6	1.147	(1.040)
Center 7	1.257	(1.061)
Center 8	-0.526	(1.000)
Acam + MM	-0.279	(6.169)
Nalt + MM	0.101	(8.880)
Acam + Nalt + MM	0.359	(7.831)
MM + CBI	-0.405	(9.354)
Acam + MM + CBI	0.548	(7.602)
Nalt + MM + CBI	-0.006	(3.168)
Acam + Nalt + MM + CBI	0.152	(3.217)
CBI Only	-0.045	(2.992)
Constant	0.790	(2.852)

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Appendix Table B.6 (Continued). Estimate for Per Period Attrition

	Logit v. Still in Study		
	Left Study		
	Estimate	.	St.Err
	Points of Support		
Permanent UH			
1		Normalized to 0	
2	0.224		(6.326)
3	-1.038		(8.034)
4	-1.466		(4.068)
5	-0.186		(5.186)
6	-0.310		(8.391)
7	1.956*		(1.066)
Time Varying UH			
1		Normalized to 0	
2	1.499***		(0.029)
3	2.031***		(0.124)
4	2.466		(2.578)
5	-2.582		(3.807)

Notes: ***indicates significance at 1%, **5%, and *10%. Indicators for quarter of interview, study location, and year of entering the study are not reported. Estimates are for time periods 2-8, after the end of COMBINE treatment. Estimated jointly with employment, alcohol use, treatment and self-help visits, wages, attrition, and initial condition equations.

Appendix Table B.7: Unobserved Heterogeneity Probability Weights

	Probability Weight
Points of Support	
Permanent UH	
1	0.092
2	0.124
3	0.269
4	0.141
5	0.128
6	0.158
7	0.087
Time Varying UH	
1	0.242
2	0.036
3	0.025
4	0.024
5	0.672

Appendix Table B.8. Initial Condition: Number of Years of Education at Beginning of COMBINE Study

	Estimate	Standard Error
Manufacturing Wage	0.033**	(0.014)
Construction Wage	0.011	(0.062)
Retail Wage	0.100***	(0.008)
Average # of Unused OP Sessions x Sliding Scale Fee	0.031	(0.063)
Indicator of Parent AUD x Average Home Price	0.001	(0.041)
Indicator of Parent with AUD	-0.089***	(0.001)
Female X Indicator of Parent with AUD	-0.033	(0.027)
age X Indicator of Parent with AUD	0.076*	(0.043)
Price Fluoxetine	0.008	(0.024)
Price Naltrexone	0.002	(0.003)
Price of Beer	-0.312***	(0.004)
Price of Private PCP Visit	-0.004	(0.167)
Price of Gasoline	-0.850***	(0.005)
Average Home Price	0.271	(0.603)
Non-Labor Income/1000	0.004	(0.191)
Female	0.657***	(0.012)
Age	0.068	(0.347)
Age x Female	-0.212***	(0.052)
Married or Living with Partner	0.240	(0.155)
Center 2	0.200***	(0.067)
Center 3	0.257	(0.164)
Center 4	-0.147	(0.339)
Center 5	0.094	(0.339)
Center 6	0.358	(0.268)
Center 7	1.114***	(0.264)
Center 8	-0.226	(0.462)
Constant	-0.146	(0.374)
Points of Support		
Permanent UH		
1	Normalized to 0	
2	0.245	(0.155)
3	0.195	(0.144)
4	0.322**	(0.154)
5	-0.033	(0.160)
6	-0.113	(0.154)
7	0.646***	(0.167)

Notes:***indicates significance at 1%, **5%, and *10%. Indicators for quarter of interview, study location, and year of entering the study are not reported. Outcomes are combined between Time Periods 0 and 1.

Appendix Table B.9. Initial Condition: Employment Status at Beginning of COMBINE Study

	Multinomial Logit, v. Not employed during Period					
	Employed <90% of period		Employed Part Time >90% of period		Employed Full Time >90% of period	
	Estimate	St. Err.	Estimate	St. Err.	Estimate	St. Err
Manufacturing Wage	-0.615*	(0.323)	-0.220	(0.336)	-0.124	(0.278)
Construction Wage	0.060	(0.056)	-0.005	(0.073)	0.177***	(0.055)
Retail Wage	-0.421	(0.318)	0.305	(0.337)	-0.319	(0.293)
Average # Unused OP Sessions x Sliding Scale Fee	0.036	(0.190)	0.327*	(0.197)	0.280*	(0.167)
Indicator of Parent AUD x Average Home Price	-0.004	(0.008)	-0.011	(0.009)	-0.026***	(0.007)
Arm 5 x Gas Price at Time 1 x Travel Time to Study Site	-2.479***	(0.699)	-2.950***	(0.744)	-1.262**	(0.634)
Arm 7 x Gas Price at Time 1 x Travel Time to Study Site	-0.498	(0.428)	-0.176	(0.434)	-0.085	(0.369)
Indicator of Parent with AUD	-0.066	(0.184)	-0.284	(0.196)	0.000	(0.164)
Female X Indicator of Parent with AUD	-0.086	(0.248)	-0.007	(0.263)	-0.204	(0.222)
Age X Indicator of Parent with AUD	-0.290**	(0.114)	-0.045	(0.120)	-0.141	(0.103)
Price Fluoxetine	-0.007	(0.008)	-0.009	(0.009)	-0.008	(0.007)
Price Naltrexone	0.007	(0.018)	0.028	(0.020)	0.002	(0.016)
Price of Beer	-0.143	(0.509)	-0.633	(0.475)	-0.868**	(0.400)
Average # of Unused OP Sessions	-0.037	(0.019)	-0.041**	(0.019)	-0.025	(0.016)
Price of Gasoline	-0.013	(1.916)	0.930	(1.999)	3.647**	(1.711)
Average Home Price	-0.510	(0.464)	-0.308	(0.462)	-1.082***	(0.394)
Non-Labor Income/1000	-0.052	(0.050)	0.026	(0.050)	-0.179***	(0.043)
Female	1.913*	(1.046)	3.752***	(1.044)	1.637	(1.018)
Age	0.480**	(0.238)	0.818***	(0.411)	0.451**	(0.217)
Age x Female	-0.773	(0.505)	-1.139**	(0.495)	-0.669	(0.476)
Married or Living With Partner	-0.721*	(0.387)	-0.062	(0.403)	-0.022	(0.345)
Years of Education	0.974***	(0.190)	0.846***	(0.191)	1.079***	(0.168)
Center 2	0.307	(0.785)	0.897	(0.862)	0.974	(0.698)
Center 3	-0.899	(1.423)	-2.566*	(1.520)	-0.907	(1.317)
Center 4	6.384***	(1.500)	5.988***	(1.532)	8.413***	(1.361)
Center 5	2.009*	(1.181)	2.456*	(1.268)	0.524	(1.053)
Center 6	0.705	(1.094)	-0.328	(1.182)	0.554	(1.014)
Center 7	1.120	(1.884)	0.170	(2.027)	-1.768	(1.696)
Center 8	8.565***	(1.675)	5.936***	(1.759)	7.351***	(1.514)
Acam + MM	-0.509	(0.611)	-1.300**	(0.662)	-1.363**	(0.593)
Nalt + MM	-0.108	(0.659)	-0.389	(0.696)	-0.965	(0.598)
Acam + Nalt + MM	-0.266	(0.715)	-0.174	(0.714)	-0.985	(0.609)
MM + CBI	2.139***	(0.830)	2.374***	(1.133)	2.944***	(0.702)
Acam + MM + CBI	0.028	(0.667)	0.302	(0.713)	-0.781	(0.581)
Nalt + MM + CBI	-0.574	(0.790)	-0.339	(0.871)	-0.969	(0.716)
Acam + Nalt + MM + CBI	0.252	(0.680)	-0.261	(0.764)	-0.391	(0.614)
CBI Only	0.959	(0.653)	-0.022	(0.773)	-0.090	(0.594)
Constant	25.204***	(9.397)	15.138	(8.105)	10.197	(8.695)
Points of Support						
Permanent UH						
1		Normalized to 0		Normalized to 0		Normalized to 0
2	-1.953***	(0.737)	-2.983***	(0.590)	-3.453***	(1.000)
3	-1.029*	(0.568)	-1.139	(1.311)	-0.559	(1.000)
4	0.530	(0.595)	-0.693	(0.641)	1.274	(1.000)
5	-1.984***	(0.737)	-2.638***	(0.517)	-3.059***	(1.000)
6	-1.667***	(0.599)	-2.764**	(0.534)	-2.522**	(1.000)
7	2.573*	(1.441)	2.103***	(0.556)	1.532	(1.000)

Notes: ***Indicates significance at 1%, **5%, and 10%. Indicators for quarter of interview, study location, and year of entering the study are not reported. Outcomes are combined between Time Periods 0 and 1

Appendix Table B.10. Initial Condition: Alcohol Use at Beginning of COMBINE Study

	Logit v. Problem Drinking During Less than 50% of Period	
	Problem Drinking More than 50% of Period	
	Estimate	St.Err.
Manufacturing Wage	-0.399	(0.260)
Construction Wage	-0.022	(0.027)
Retail Wage	0.356*	(0.195)
Average # of Unused OP Sessions x Sliding Scale Fee	0.570***	(0.145)
Indicator of Parent AUD x Average Home Price	-0.003	(0.004)
Indicator of Parent with AUD	-0.044	(0.087)
Female X Indicator of Parent with AUD	0.006	(0.143)
age X Indicator of Parent with AUD	0.125	(0.008)
Price Fluoxetine	-0.021***	(0.007)
Price Naltrexone	-0.007	(0.013)
Price of Beer	0.948	(0.628)
Average # of Unused OP Sessions	-0.023*	(0.014)
Price of Gasoline	4.629***	(1.294)
Average Home Price	-1.686***	(0.613)
Non-Labor Income/1000	0.062	(0.038)
Female	0.184	(0.935)
Age	-0.389**	(0.166)
Age x Female	-0.041	(0.416)
Married of Living with Partner	0.084	(0.216)
Years of Education	0.047	(0.116)
Center 2	-0.725	(0.717)
Center 3	-4.287***	(0.759)
Center 4	-0.881	(0.862)
Center 5	-2.538***	(0.824)
Center 6	-4.060***	(0.730)
Center 7	-4.118***	(0.984)
Center 8	-2.974***	(0.965)
constant	-5.550***	(1.673)
Points of Support		
Permanent UH		
1	Normalized to 0	
2	0.298	(0.557)
3	-0.245	(0.434)
4	0.020	(0.472)
5	-0.298	(0.484)
6	-0.512	(0.559)
7	-0.862	(0.662)

Notes: ***indicates significance at 1%, **5%, and *10%. Indicators for quarter of interview, study location, and year of entering the study are not reported. Outcomes are combined between Time Periods 0 and 1

Appendix Table B.11. Initial Condition: Alcohol Use During COMBINE Treatment

	Multinomial Logit v. Abstinent					
	Non-Problem Drinking Only		Problem Drinking Less than 50% of Period		Problem Drinking More than 50% of Period	
	Estimate	St.Err.	Estimate	St.Err.	Estimate	St.Err.
Manufacturing Wage	0.296	(0.356)	-0.226	(0.252)	0.178	(0.258)
Construction Wage	0.025	(0.071)	0.028	(0.054)	0.021	(0.055)
Retail Wage	0.518	(0.359)	-0.058	(0.250)	0.351	(0.255)
Average # of Unused OP Sessions x Sliding Scale Fee	-0.080	(0.207)	-0.293**	(0.148)	0.005	(0.146)
Indicator of Parent AUD x Average Home Price	0.002	(0.010)	0.006	(0.006)	0.005	(0.007)
Arm 5 x Gas Price at Time 1 x Travel Time to Study Site	-0.017	(0.791)	0.990	(0.609)	1.201*	(0.620)
Arm 7 x Gas Price at Time 1 x Travel Time to Study Site	0.506	(0.438)	0.321	(0.324)	0.690**	(0.331)
Indicator of Parent with AUD	-0.083	(0.129)	-0.060	(0.095)	-0.048	(0.099)
Female X Indicator of Parent with AUD	0.397*	(0.224)	0.251	(0.180)	0.148	(0.187)
age X Indicator of Parent with AUD	-0.067	(0.119)	0.060	(0.099)	0.190*	(0.101)
Price Fluoxetine	0.000	(0.008)	-0.011*	(0.006)	-0.013*	(0.006)
Price Naltrexone	-0.013	(0.021)	-0.019	(0.014)	-0.002	(0.015)
Price of Beer	-0.941*	(0.511)	-0.088	(0.376)	-0.158	(0.372)
Average # of Unused OP Sessions	0.016	(0.020)	-0.014	(0.015)	0.000	(0.015)
Price of Gasoline	-0.524	(1.841)	-0.064	(1.441)	-1.174	(1.469)
Average Home Price	1.133**	(0.470)	0.217	(0.377)	0.177	(0.372)
Non-Labor Income/1000	0.075	(0.053)	0.000	(0.043)	0.079*	(0.043)
Female	-3.347***	(1.154)	-1.434	(0.980)	-0.716	(0.990)
Age	0.171	(0.253)	-0.302	(0.206)	-0.610***	(0.213)
Age x Female	1.409***	(0.495)	0.804*	(0.449)	0.507	(0.462)
Married or Living With Partner	0.375	(0.349)	-0.213	(0.259)	-0.073	(0.268)
Education	0.218	(0.179)	0.299**	(0.138)	0.066	(0.142)
Center 2	0.629	(0.818)	0.621	(0.642)	0.585	(0.658)
Center 3	-0.500	(1.644)	0.986	(1.132)	-0.452	(1.152)
Center 4	-1.301	(1.535)	0.251	(1.133)	-2.176*	(1.164)
Center 5	0.742	(1.299)	0.461	(0.982)	-1.319	(1.007)
Center 6	-0.379	(1.285)	-0.364	(0.891)	-1.830**	(0.923)
Center 7	-0.741	(1.976)	0.204	(1.407)	-0.786	(1.434)
Center 8	-0.546	(1.892)	0.978	(1.302)	-2.162	(1.328)
Acam + MM	-0.021	(0.720)	0.082	(0.505)	-0.029	(0.513)
Nalt + MM	0.769	(0.649)	0.531	(0.528)	-0.296	(0.552)
Acam + Nalt + MM	0.548	(0.665)	-0.082	(0.529)	-0.436	(0.534)
MM + CBI	-0.138	(0.920)	-0.127	(0.641)	-0.481	(0.659)
Acam + MM + CBI	0.595	(0.620)	-0.112	(0.512)	-0.564	(0.529)
Nalt + MM + CBI	-0.877	(0.902)	-0.806	(0.655)	-0.837	(0.635)
Acam + Nalt + MM + CBI	-0.014	(0.664)	-0.314	(0.532)	-0.495	(0.547)
CBI Only	0.951	(0.726)	0.948	(0.581)	0.437	(0.608)
constant	-6.758	(10.217)	2.843	(6.821)	-8.495	(7.003)
Points of Support						
Permanent UH						
1	Normalized to 0					
2	-2.132**	(0.871)	0.899	(0.626)	0.378	(0.395)
3	-0.083	(0.716)	0.697	(0.594)	-0.017	(11.080)
4	0.482	(0.742)	0.753	(0.591)	0.467	(0.484)
5	0.351	(0.705)	0.900**	(0.427)	0.424	(0.617)
6	0.047	(0.865)	0.990*	(0.524)	0.125	(0.562)
7	-0.055	(0.866)	0.941*	(0.560)	-6.908***	(0.527)

Notes: ***indicates significance at 1%, **5%, and *10%. Indicators for quarter of interview, study location, and year of entering the study are not reported.

Appendix Table B.12. Initial Condition: Use of Antidepressants and Self Help Visits at Beginning of COMBINE Study

	Logit v. No Use of Antidepressants		Logit v. No Self Help Visits	
	Use of Antidepressants		No Self Help Visits	
	Estimate	St.Err.	Estimate	St.Err.
Manufacturing Wage	-0.342	(0.289)	0.595***	(0.179)
Construction Wage	0.249**	(0.106)	0.019	(0.039)
Retail Wage	-0.168	(0.298)	-0.440***	(0.165)
Average # of Unused OP Sessions x Sliding Scale Fee	-0.302*	(0.194)	-0.288**	(0.131)
Indicator of Parent AUD x Average Home Price	-0.033*	(0.018)	0.007	(0.005)
Arm 5 x Gas Price at Time 1 x Travel Time to Study Site	0.514	(0.771)	-1.100**	(0.517)
Arm 7 x Gas Price at Time 1 x Travel Time to Study Site	-0.330	(0.386)	-0.639***	(0.238)
Indicator of Parent with AUD	-0.141	(0.150)	0.124	(0.079)
Female X Indicator of Parent with AUD	-0.227	(0.225)	-0.072	(0.131)
age X Indicator of Parent with AUD	-0.120	(0.130)	-0.118	(0.075)
Price Fluoxetine	0.012	(0.011)	0.013**	(0.006)
Price Naltrexone	-0.018	(0.020)	0.000	(0.011)
Price of Beer	-0.398	(0.496)	0.212	(0.324)
Average # of Unused OP Sessions	-0.012	(0.021)	-0.018	(0.013)
Price of Gasoline	0.186	(1.637)	-3.632***	(0.956)
Average Home Price	0.392	(0.487)	0.447	(0.292)
Non-Labor Income/1000	-0.028	(0.053)	0.023	(0.034)
Female	-0.510	(0.993)	-1.625*	(0.934)
Age	-0.305	(0.257)	0.081	(0.165)
Age x Female	0.887*	(0.457)	0.698*	(0.420)
Married or Living With Partner	0.290	(0.316)	-0.082	(0.210)
Years of Education	0.216	(0.174)	-0.172	(0.114)
Center 2	0.998	(0.879)	-0.937	(0.654)
Center 3	1.165	(1.702)	0.183	(0.781)
Center 4	2.342**	(1.103)	0.379	(0.889)
Center 5	4.035***	(1.201)	2.096***	(0.736)
Center 6	1.519	(1.225)	1.444**	(0.681)
Center 7	2.860*	(1.656)	2.848***	(0.784)
Center 8	3.343**	(1.614)	1.703*	(0.881)
Acam + MM	-0.120	(0.595)	-0.716	(0.456)
Nalt + MM	0.241	(0.569)	-0.380	(0.444)
Acam + Nalt + MM	-0.549	(0.826)	-0.135	(0.436)
MM + CBI	1.488*	(0.860)	-0.121	(0.580)
Acam + MM + CBI	-0.534	(0.684)	-0.393	(0.434)
Nalt + MM + CBI	-0.210	(0.767)	-0.236	(0.584)
Acam + Nalt + MM + CBI	-0.016	(0.572)	-0.422	(0.435)
CBI Only	-0.043	(0.586)	0.059	(0.427)
Constant	-4.938	(4.162)	17.649***	(2.562)
Points of Support				
Permanent UH				
1	Normalized to 0		Normalized to 0	
2	-1.076*	(0.624)	1.019**	(0.490)
3	0.249	(0.528)	1.452***	(0.415)
4	-0.646	(0.619)	1.294***	(0.440)
5	-0.405	(0.567)	1.528**	(0.451)
6	0.074	(0.581)	2.839***	(0.462)
7	-6.141*	(3.701)	-4.902***	(0.546)

Notes: ***indicates significance at 1%, **5%, and *10%. Indicators for quarter of interview, study location, and year of entering the study are not reported. Outcomes are combined between Time Periods 0 and 1.

Appendix Table B.13. Wald Test Results

Initial Conditions	Exclusion Restrictions	IC Equations		Per-Period Equations		
		Wald	p-value*	Outcome	Wald	p-value*
Employment	Manufacturing Wage	8.01	0.045	Employment	6.42	0.716
	Construction Wage					
	Arm 5 x Gas Price at Time 1 x Travel Time to Study Site					
Alcohol Period 1	Average # of Unused OP Sessions x Sliding Scale Fee	6.17	0.043	Alcohol	7.70	0.949
	Age X Indicator of Parent with AUD					
Alcohol Period 2	Average # of Unused OP Sessions x Sliding Scale Fee	8.53	0.037			
	Arm 5 x Gas Price at Time 1 x Travel Time to Study Site					
	Arm 7 x Gas Price at Time 1 x Travel Time to Study Site					
Self-Help	Manufacturing Wage	6.48	0.039	Treatment	5.16	0.574
	Average # of Unused OP Sessions x Sliding Scale Fee					
Antidepressants	Indicator of Parent AUD x Average Home Price	9.03	0.011	Antidepressants	3.53	0.185
	Construction Wage					
Education	Indicator of Parent with AUD	8.84	0.013	Employment	4.28	0.645
				Alcohol	3.93	0.687
				Treatment	6.10	0.421
	Age X Indicator of Parent with AUD			Antidepressants	2.69	0.262
				Log wage	4.19	0.101

*p-values calculated as 2-tailed chi square with r-df's

Appendix C

Appendix Table C.1. Model Fit for All Outcomes: Comparison of Predicted Means Over Analysis Periods 3-9

	# Mass Points	Employment				Log Wage	Antidepressants	Alcohol Treatment				Alcohol			
	UH Perm, TV	Base	1	2	3			Base	1	2	3	Base	1	2	3
Observed Means	na	0.170	0.171	0.124	0.534	2.795	0.161	0.683	0.171	0.072	0.074	0.282	0.096	0.216	0.407
Stata Pred Values	na	0.170	0.171	0.124	0.534	2.838	0.161	0.683	0.171	0.072	0.074	0.282	0.096	0.216	0.407
Fortran Pred Values	1, 1	0.170	0.176	0.118	0.535	2.837	0.152	0.692	0.165	0.075	0.067	0.279	0.097	0.227	0.397
Fortran/Update	1, 1	0.161	0.176	0.121	0.541	2.820	0.152	0.692	0.165	0.075	0.068	0.28	0.098	0.225	0.398
DFRE with Updating	2, 2	0.166	0.176	0.12	0.538	2.821	0.152	0.700	0.161	0.072	0.066	0.274	0.100	0.223	0.403
DFRE with Updating	3, 3	0.157	0.178	0.126	0.539	2.826	0.164	0.688	0.168	0.074	0.07	0.276	0.098	0.226	0.400
DFRE with Updating	4, 4	0.164	0.178	0.120	0.538	2.810	0.158	0.684	0.17	0.076	0.071	0.279	0.101	0.224	0.397
DFRE with Updating	5, 5	0.163	0.178	0.123	0.537	2.822	0.160	0.688	0.163	0.075	0.074	0.279	0.098	0.22	0.404
DFRE with Updating	6, 5	0.172	0.173	0.122	0.533	2.825	0.161	0.689	0.164	0.077	0.069	0.281	0.098	0.223	0.398
DFRE with Updating	7, 5	0.170	0.171	0.124	0.534	2.795	0.161	0.683	0.171	0.072	0.074	0.282	0.096	0.216	0.407

Appendix Table C.2 Comparison Over Time (Analysis Periods 3-9) of Actual Observed Outcomes, Predicted Outcomes, and Predicted Outcomes Based on Updating

time		Base Outcome 0			Outcome 2			Outcome 3			Outcome 4		
		Original Values	**Stata Single Equation Predictions**	**DFRE With Updating Predictions**	**Original Values**	**Stata Single Equation Predictions**	**DFRE With Updating Predictions**	**Original Values**	**Stata Single Equation Predictions**	**DFRE With Updating Predictions**	**Original Values**	**Stata Single Equation Predictions**	**DFRE With Updating Predictions**
3	Employ-ment	0.132	0.127	0.120	0.223	0.215	0.220	0.119	0.118	0.119	0.526	0.539	0.541
4		0.170	0.177	0.165	0.169	0.177	0.181	0.120	0.126	0.125	0.541	0.519	0.528
5		0.178	0.183	0.168	0.163	0.184	0.192	0.124	0.118	0.120	0.535	0.514	0.523
6		0.173	0.184	0.167	0.177	0.162	0.171	0.128	0.123	0.124	0.522	0.531	0.537
7		0.169	0.173	0.158	0.168	0.156	0.162	0.128	0.126	0.127	0.536	0.545	0.552
8		0.172	0.172	0.156	0.148	0.148	0.153	0.132	0.128	0.129	0.548	0.552	0.563
9		0.207	0.178	0.157	0.139	0.143	0.153	0.121	0.133	0.133	0.533	0.546	0.559
3	Conditional Wage	2.805	2.838	2.802									
4		2.818	2.810	2.805									
5		2.843	2.813	2.805									
6		2.841	2.825	2.814									
7		2.851	2.844	2.835									
8		2.848	2.835	2.854									
9		2.868	2.850	2.862									
3	Antidepressants	0.114	0.130	0.117									
4		0.138	0.132	0.125									
5		0.165	0.143	0.147									
6		0.168	0.157	0.164									
7		0.186	0.172	0.181									
8		0.182	0.195	0.203									
9		0.184	0.215	0.213									

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Appendix Table C.2 (Continued) Comparison Over Time (Analysis Periods 3-9) of Actual Observed Outcomes, Predicted Outcomes, and Predicted Outcomes Based on Updating

		Base Outcome 0			Outcome 2			Outcome 3			Outcome 4		
time		**Original Values**	**Stata Single Equation Predictions**	**DFRE With Updating Predictions**	**Original Values**	**Stata Single Equation Predictions**	**DFRE With Updating Predictions**	**Original Values**	**Stata Single Equation Predictions**	**DFRE With Updating Predictions**	**Original Values**	**Stata Single Equation Predictions**	**DFRE With Updating Predictions**
3	Alcohol	0.205	0.175	0.176	0.084	0.082	0.079	0.283	0.275	0.278	0.428	0.468	0.467
4		0.248	0.277	0.270	0.099	0.097	0.092	0.213	0.218	0.222	0.440	0.408	0.417
5		0.271	0.288	0.286	0.097	0.101	0.097	0.204	0.224	0.228	0.428	0.387	0.388
6		0.277	0.315	0.316	0.086	0.099	0.100	0.217	0.197	0.210	0.420	0.388	0.377
7		0.320	0.314	0.312	0.099	0.097	0.102	0.188	0.195	0.209	0.393	0.395	0.377
8		0.332	0.315	0.304	0.103	0.096	0.104	0.198	0.191	0.206	0.366	0.398	0.386
9		0.353	0.306	0.299	0.104	0.098	0.103	0.196	0.198	0.205	0.347	0.397	0.392
3	Alcohol Treatment	0.661	0.648	0.658	0.262	0.180	0.179	0.045	0.088	0.092	0.032	0.084	0.072
4		0.712	0.726	0.722	0.228	0.148	0.152	0.036	0.066	0.068	0.023	0.060	0.058
5		0.693	0.711	0.710	0.230	0.157	0.157	0.046	0.070	0.069	0.031	0.062	0.064
6		0.687	0.704	0.710	0.240	0.164	0.159	0.043	0.067	0.064	0.030	0.066	0.067
7		0.693	0.680	0.688	0.241	0.175	0.168	0.040	0.069	0.067	0.026	0.076	0.078
8		0.671	0.657	0.659	0.243	0.186	0.176	0.058	0.071	0.070	0.028	0.086	0.090
9		0.654	0.639	0.642	0.260	0.195	0.182	0.058	0.073	0.081	0.028	0.093	0.101

Appendix D. Marginal Effects Tables

Appendix Table D.1. Marginal Effect of Drinking Status During COMBINE Treatment (T=2)

Drinking Outcome During COMBINE Treatment		Not Em-ployed	Employed < 90% of Period	Employed Part Time > 90% of Period	Employed Full Time > 90% of Period	Conditional Log Wage	Anti-Depress-ant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Abstinent	Non-Problem Drinking Only	Problem Drinking Less than 50% of Period	Problem Drinking More than 50% of Period
Average Outcome															
Abstinence		0.155	0.150	0.129	0.566	2.867	0.157	0.731	0.145	0.072	0.052	0.415	0.085	0.178	0.322
Non-Problem Drinking Only		0.143	0.172	0.125	0.561	2.805	0.140	0.773	0.091	0.069	0.067	0.211	0.222	0.275	0.292
Problem Drinking <50% of Period		0.194	0.180	0.116	0.509	2.805	0.172	0.656	0.176	0.087	0.082	0.261	0.095	0.286	0.358
Problem Drinking >50% of Period		0.172	0.178	0.122	0.528	2.823	0.161	0.666	0.189	0.073	0.072	0.245	0.067	0.185	0.503
Marginal Effects															
	Relative To														
Non-Problem Drinking Only	Abstinence	-0.012	0.022	-0.004	-0.005	-0.063	-0.017	0.042	-0.055	-0.003	0.016	-0.204	0.137	0.098	-0.030
		(0.010)	(0.013)	(0.012)	(0.018)	(0.008)	(0.014)	(0.019)	(0.014)	(0.009)	(0.011)	(0.015)	(0.015)	(0.018)	(0.019)
		p=.224	p=.108	p=.705	p=.775	p=.000	p=.206	p=.033	p=.000	p=.790	p=.177	p=.000	p=.000	p=.000	p=.107
Problem Drinking <50% of Period		0.039	0.031	-0.013	-0.057	-0.063	0.015	-0.075	0.030	0.015	0.030	-0.154	0.010	0.109	0.036
		(0.007)	(0.009)	(0.009)	(0.012)	(0.006)	(0.010)	(0.014)	(0.010)	(0.007)	(0.008)	(0.013)	(0.007)	(0.011)	(0.013)
		p=.000	p=.001	p=.154	p=.000	p=.000	p=.145	0.000	p=.003	p=.042	p=.000	p=.000	p=.187	p=.000	p=.007
Problem Drinking > 50% of Period		0.017	0.029	-0.007	-0.038	-0.045	0.004	-0.065	0.044	0.001	0.020	-0.170	-0.018	0.007	0.181
		(0.007)	(0.008)	(0.007)	(0.011)	(0.006)	(0.009)	(0.015)	(0.010)	(0.007)	(0.008)	(0.013)	(0.008)	(0.009)	(0.013)
		p=.017	p=.000	p=.344	p=.001	p=.000	p=.678	0.000	p=.000	p=.830	p=.013	p=.000	p=.020	p=.419	p=.000

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Appendix Table D.1. (Continued) Marginal Effect of Drinking Status During COMBINE Treatment (T=2)

Drinking Outcome During COMBINE Treatment		Not Employed	Employed < 90% of Period	Employed Part Time > 90% of Period	Employed Full Time > 90% of Period	Conditional Log Wage	Anti-Depress-ant Use	No Treatment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Abstinent	Non-Problem Drinking Only	Problem Drinking Less than 50% of Period	Problem Drinking More than 50% of Period
Problem Drinking **Less** than 50% of Period	Non-Problem Drinking Only	0.052	0.009	-0.008	-0.052	0.000	0.032	-0.117	0.085	0.018	0.015	0.050	-0.127	0.011	0.066
		(0.011)	(0.012)	(0.012)	(0.017)	(0.008)	(0.012)	(0.019)	(0.014)	(0.009)	(0.012)	(0.013)	(0.017)	(0.017)	(0.019)
		p=.000	p=.459	p=.494	p=.002	p=.989	p=.010	p=.000	p=.000	p=.062	p=.217	p=.000	p=.000	p=.515	p=.001
Problem Drinking **More** than 50% of Period		0.029	0.007	-0.003	-0.033	0.018	0.021	-0.107	0.099	0.004	0.004	0.034	-0.155	-0.090	0.211
		(0.010)	(0.013)	(0.012)	(0.016)	(0.007)	(0.012)	(0.019)	(0.014)	(0.009)	(0.012)	(0.014)	(0.018)	(0.016)	(0.019)
		p=.006	p=.595	p=.837	p=.044	p=.011	p=.075	p=.000	p=.000	p=.670	p=.715	p=.013	p=.000	p=.000	p=.000
Marginal Effects															
Problem Drinking **>**50% of Period	Problem Drinking **<**50% of Period	-0.022	-0.002	0.006	0.019	0.018	-0.011	0.011	0.013	-0.014	-0.010	-0.016	-0.028	-0.101	0.145
		(0.007)	(0.008)	(0.006)	(0.010)	(0.005)	(0.007)	(0.010)	(0.008)	(0.006)	(0.006)	(0.009)	(0.006)	(0.008)	(0.011)
		p=.001	p=.791	p=.360	p=.057	p=.001	p=.134	p=.307	p=.092	p=.017	p=.114	p=.100	p=.000	p=.000	p=.000

Appendix Table D.2. Marginal Effect of Drinking Status During COMBINE Treatment (T=2) - Estimated without controlling for unobserved heterogeneity

Drinking Outcome During COMBINE Treatment		Not Em-ployed	Employed < 90% of Period	Employed Part Time > 90% of Period	Employed Full Time > 90% of Period	Conditional Log Wage	Anti-Depress-ant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Abstinent	Non-Problem Drinking Only	Problem Drinking Less than 50% of Period	Problem Drinking More than 50% of Period
Average Outcome															
Abstinence		0.152	0.148	0.119	0.581	0.499	0.132	0.729	0.167	0.061	0.043	0.533	0.089	0.155	0.223
Non-Problem Drinking Only		0.142	0.168	0.123	0.567	0.481	0.125	0.767	0.105	0.066	0.063	0.245	0.240	0.276	0.239
Problem Drinking <50% of Period		0.190	0.185	0.118	0.507	0.418	0.167	0.660	0.175	0.086	0.079	0.242	0.096	0.308	0.354
Problem Drinking >50% of Period		0.171	0.184	0.120	0.525	0.449	0.157	0.671	0.175	0.077	0.076	0.177	0.058	0.197	0.569
Marginal Effects															
	Relative To														
Non-Problem Drinking Only		-0.011	0.020	0.004	-0.014	-0.017	-0.007	0.037	-0.061	0.005	0.019	-0.288	0.150	0.121	0.017
		(0.013)	(0.014)	(0.013)	(0.018)	(0.021)	(0.013)	(0.020)	(0.015)	(0.010)	(0.013)	(0.022)	(0.017)	(0.015)	(0.020)
		p=.395	p=.153	p=.741	p=.440	p=.402	p=.615	p=.066	p=.000	p=.652	p=.130	p=.000	p=.000	p=.000	p=.418
Problem Drinking **Less** than 50% of Period		0.038	0.038	-0.001	-0.075	-0.081	0.035	-0.069	0.009	0.025	0.036	-0.291	0.007	0.152	0.131
		(0.011)	(0.011)	(0.010)	(0.012)	(0.019)	(0.011)	(0.017)	(0.012)	(0.007)	(0.012)	(0.017)	(0.010)	(0.010)	(0.015)
	Abstinence	p=.001	p=.001	p=.908	p=.000	p=.000	p=.001	p=.000	p=.476	p=.001	p=.003	p=.000	p=.451	p=.000	p=.000
Problem Drinking **More** than 50% of Period		0.019	0.036	0.001	-0.056	-0.050	0.025	-0.058	0.009	0.016	0.033	-0.356	-0.032	0.041	0.346
		(0.010)	(0.011)	(0.011)	(0.014)	(0.018)	(0.010)	(0.017)	(0.013)	(0.009)	(0.010)	(0.017)	(0.008)	(0.011)	(0.015)
		p=.075	p=.002	p=.901	p=.000	p=.007	p=.017	p=.001	p=.506	p=.058	p=.002	p=.000	p=.000	p=.000	p=.000

Continued on next page

Appendix Table D.2. (Continued) Marginal Effect of Drinking Status During COMBINE Treatment (T=2) - Estimated without controlling for unobserved heterogeneity

Drinking Outcome During COMBINE Treatment		Not Employed	Employed < 90% of Period	Employed Part Time > 90% of Period	Employed Full Time > 90% of Period	Conditional Log Wage	Anti-Depress-ant Use	No Treatment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Abstinent	Non-Problem Drinking Only	Problem Drinking Less than 50% of Period	Problem Drinking More than 50% of Period
Problem Drinking **Less** than 50% of Period	Non-Problem Drinking Only	0.049	0.017	-0.006	-0.060	-0.063	0.042	-0.107	0.070	0.020	0.017	-0.003	-0.143	0.031	0.115
		(0.011)	(0.013)	(0.012)	(0.018)	(0.022)	(0.013)	(0.021)	(0.015)	(0.009)	(0.011)	(0.018)	(0.016)	(0.014)	(0.019)
		p=.000	p=.185	p=.645	p=.001	p=.005	p=.002	p=.000	p=.000	p=.024	p=.136	p=.871	p=.000	p=.028	p=.000
Problem Drinking **More** than 50% of Period		0.029	0.015	-0.003	-0.042	-0.033	0.032	-0.096	0.070	0.012	0.014	-0.068	-0.182	-0.080	0.330
		(0.011)	(0.012)	(0.013)	(0.019)	(0.024)	(0.014)	(0.019)	(0.016)	(0.010)	(0.013)	(0.020)	(0.017)	(0.016)	(0.020)
		p=.011	p=.213	p=.814	p=.028	p=.178	p=.028	p=.000	p=.000	p=.227	p=.300	p=.001	p=.000	p=.000	p=.000
Marginal Effects															
Problem Drinking **>**50% of Period	Problem Drinking **<**50% of Period	-0.020	-0.002	0.003	0.019	0.031	-0.010	0.011	0.000	-0.008	-0.003	-0.065	-0.039	-0.111	0.215
		(0.010)	(0.008)	(0.009)	(0.011)	(0.016)	(0.011)	(0.016)	(0.012)	(0.007)	(0.011)	(0.012)	(0.008)	(0.011)	(0.014)
		p=.046	p=.839	p=.772	p=.087	p=.068	p=.337	p=.479	p=.973	p=.253	p=.790	p=.000	p=.000	p=.000	p=.000

Appendix Table D.3 - Over Time Marginal Effects of Non-Problem Drinking Only v. Abstinent in Time Period 2

Time Period	Not Em-ployed	Employed < 90% of Period	Employed Part Time > 90% of Period	Employed Full Time > 90% of Period	Conditional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Outpatient Therapy (No RxT)	RxT	Abstinent	Non-Problem Drinking Only	Problem Drinking Less than 50% of Period	Problem Drinking More than 50% of Period
	-0.011	0.015	-0.003	-0.001	-0.041	-0.011	0.036	-0.047	-0.001	0.012	-0.125	0.077	0.083	-0.035
3	(0.006)	(0.011)	(0.007)	(0.013)	(0.006)	(0.008)	(0.014)	(0.012)	(0.008)	(0.008)	(0.009)	(0.010)	(0.015)	(0.017)
	p=.096	p=.179	p=.687	p=.910	p=.000	p=.152	p=.017	p=.001	p=.900	p=.161	p=.000	p=.000	p=.000	p=.040
	-0.013	0.017	-0.003	-0.001	-0.046	-0.013	0.036	-0.044	-0.002	0.010	-0.167	0.104	0.086	-0.023
4	(0.009)	(0.011)	(0.009)	(0.014)	(0.006)	(0.009)	(0.014)	(0.011)	(0.007)	(0.008)	(0.012)	(0.011)	(0.015)	(0.017)
	p=.149	p=.139	p=.737	p=.961	p=.000	p=.175	p=.018	p=.001	p=.793	p=.191	p=.000	p=.000	p=.000	p=.193
	-0.013	0.020	-0.003	-0.004	-0.052	-0.015	0.039	-0.049	-0.003	0.012	-0.191	0.120	0.098	-0.026
5	(0.010)	(0.013)	(0.010)	(0.016)	(0.007)	(0.011)	(0.017)	(0.013)	(0.008)	(0.009)	(0.014)	(0.013)	(0.016)	(0.018)
	p=.186	p=.123	p=.721	p=.824	p=.000	p=.196	p=.026	p=.001	p=.747	p=.194	p=.000	p=.000	p=.000	p=.151
	-0.012	0.022	-0.004	-0.005	-0.059	-0.017	0.041	-0.052	-0.003	0.014	-0.216	0.139	0.102	-0.025
6	(0.011)	(0.013)	(0.011)	(0.018)	(0.008)	(0.013)	(0.019)	(0.014)	(0.008)	(0.010)	(0.016)	(0.016)	(0.017)	(0.019)
	p=.255	p=.113	p=.718	p=.774	p=.000	p=.206	p=.035	p=.001	p=.732	p=.195	p=.000	p=.000	p=.000	p=.191
	-0.011	0.024	-0.005	-0.007	-0.067	-0.018	0.044	-0.057	-0.003	0.017	-0.231	0.154	0.106	-0.029
7	(0.011)	(0.014)	(0.013)	(0.020)	(0.009)	(0.015)	(0.021)	(0.015)	(0.010)	(0.012)	(0.017)	(0.018)	(0.019)	(0.020)
	p=.305	p=.109	p=.696	p=.726	p=.000	p=.231	p=.048	p=.001	p=.764	p=.189	p=.000	p=.000	p=.000	p=.145
	-0.011	0.025	-0.006	-0.008	-0.075	-0.021	0.046	-0.062	-0.003	0.020	-0.244	0.170	0.108	-0.033
8	(0.011)	(0.015)	(0.015)	(0.021)	(0.010)	(0.017)	(0.024)	(0.017)	(0.011)	(0.015)	(0.019)	(0.020)	(0.021)	(0.020)
	p=.333	p=.107	p=.701	p=.705	p=.000	p=.238	p=.061	p=.001	p=.763	p=.197	p=.000	p=.000	p=.000	p=.114
	-0.011	0.027	-0.006	-0.010	-0.084	-0.023	0.048	-0.068	-0.003	0.023	-0.252	0.178	0.112	-0.038
9	(0.012)	(0.016)	(0.016)	(0.023)	(0.012)	(0.020)	(0.026)	(0.018)	(0.013)	(0.018)	(0.019)	(0.022)	(0.023)	(0.021)
	p=.348	p=.097	p=.700	p=.670	p=.000	p=.252	p=.078	p=.001	p=.800	p=.192	p=.000	p=.000	p=.000	p=.082

Appendix Table D.4 - Over Time Marginal Effects of Problem Drinking < 50% of the Period v. Abstinent During Time Period 2

Time Period	Not Em-ployed	Employed < 90% of Period	Employed Part Time > 90% of Period	Employed Full Time > 90% of Period	Conditional Log Wage	Anti-De pressant Use	No Treat-ment	Self Help Visits	Outpatient Therapy (No RxT)	RxT	Abstinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
	0.022	0.025	-0.008	-0.039	-0.041	0.006	-0.050	0.018	0.011	0.021	-0.113	-0.001	0.089	0.026
3	(0.005)	(0.007)	(0.006)	(0.008)	(0.005)	(0.006)	(0.009)	(0.007)	(0.006)	(0.006)	(0.008)	(0.005)	(0.010)	(0.011)
	p=.000	p=.002	p=.154	p=.000	p=.000	p=.274	p=.000	p=.013	p=.054	p=.002	p=.000	p=.865	p=.000	p=.033
	0.033	0.023	-0.010	-0.046	-0.047	0.009	-0.054	0.022	0.011	0.021	-0.141	0.007	0.093	0.041
4	(0.006)	(0.007)	(0.007)	(0.009)	(0.005)	(0.007)	(0.010)	(0.007)	(0.005)	(0.005)	(0.011)	(0.005)	(0.009)	(0.012)
	p=.000	p=.004	p=.126	p=.000	p=.000	p=.206	p=.000	p=.005	p=.032	p=.001	p=.000	p=.198	p=.000	p=.002
	0.038	0.028	-0.012	-0.054	-0.055	0.011	-0.065	0.027	0.014	0.025	-0.153	0.009	0.106	0.038
5	(0.007)	(0.008)	(0.007)	(0.011)	(0.006)	(0.008)	(0.012)	(0.009)	(0.006)	(0.006)	(0.013)	(0.006)	(0.010)	(0.012)
	p=.000	p=.002	p=.131	p=.000	p=.000	p=.182	p=.000	p=.004	p=.033	p=.001	p=.000	p=.170	p=.000	p=.004
	0.043	0.030	-0.013	-0.060	-0.064	0.014	-0.074	0.031	0.014	0.028	-0.164	0.013	0.111	0.041
6	(0.008)	(0.009)	(0.009)	(0.012)	(0.006)	(0.010)	(0.014)	(0.010)	(0.007)	(0.007)	(0.014)	(0.007)	(0.010)	(0.013)
	p=.000	p=.002	p=.154	p=.000	p=.000	p=.167	p=.000	p=.003	p=.038	p=.000	p=.000	p=.090	p=.000	p=.004
	0.045	0.034	-0.014	-0.065	-0.074	0.017	-0.085	0.036	0.016	0.033	-0.167	0.013	0.116	0.038
7	(0.008)	(0.009)	(0.010)	(0.013)	(0.007)	(0.011)	(0.016)	(0.011)	(0.008)	(0.009)	(0.015)	(0.008)	(0.012)	(0.014)
	p=.000	p=.001	p=.158	p=.000	p=.000	p=.141	p=.000	p=.004	p=.044	p=.001	p=.000	p=.123	p=.000	p=.010
	0.046	0.036	-0.014	-0.067	-0.084	0.021	-0.096	0.039	0.018	0.039	-0.170	0.013	0.121	0.036
8	(0.009)	(0.009)	(0.011)	(0.014)	(0.008)	(0.013)	(0.018)	(0.013)	(0.009)	(0.010)	(0.016)	(0.009)	(0.013)	(0.015)
	p=.000	p=.001	p=.207	p=.000	p=.000	p=.126	p=.000	p=.004	p=.053	p=.001	p=.000	p=.172	p=.000	p=.022
	0.047	0.037	-0.014	-0.070	-0.095	0.024	-0.107	0.042	0.019	0.045	-0.172	0.011	0.129	0.032
9	(0.009)	(0.010)	(0.012)	(0.015)	(0.009)	(0.015)	(0.020)	(0.014)	(0.010)	(0.012)	(0.017)	(0.010)	(0.014)	(0.016)
	p=.000	p=.001	p=.240	p=.000	p=.000	p=.110	p=.000	p=.006	p=.073	p=.001	p=.000	p=.289	p=.000	p=.052

Appendix Table D.5 - Over Time Marginal Effects of Problem Drinking > 50% of Period v. Abstinent During Time Period 2

Time Period	Not Em-ployed	Employed < 90% of Period	Employed Part Time > 90% of Period	Employed Full Time > 90% of Period	Conditional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Abstinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
	0.008	0.022	-0.005	-0.025	-0.026	0.001	-0.039	0.025	0.001	0.014	-0.124	-0.020	-0.014	0.158
3	(0.004)	(0.006)	(0.004)	(0.007)	(0.004)	(0.004)	(0.009)	(0.006)	(0.005)	(0.006)	(0.008)	(0.005)	(0.008)	(0.011)
	p=.059	p=.001	p=.277	p=.001	p=.000	p=.870	p=.000	p=.000	p=.841	p=.021	p=.000	p=.000	p=.110	p=.000
	0.013	0.022	-0.006	-0.029	-0.030	0.001	-0.045	0.029	0.002	0.014	-0.159	-0.017	0.002	0.174
4	(0.006)	(0.006)	(0.005)	(0.008)	(0.004)	(0.006)	(0.010)	(0.007)	(0.004)	(0.005)	(0.011)	(0.006)	(0.008)	(0.011)
	p=.025	p=.001	p=.283	p=.001	p=.000	p=.800	p=.000	p=.000	p=.704	p=.014	p=.000	p=.010	p=.818	p=.000
	0.016	0.027	-0.006	-0.036	-0.036	0.002	-0.055	0.037	0.002	0.017	-0.169	-0.017	0.007	0.179
5	(0.007)	(0.007)	(0.006)	(0.010)	(0.005)	(0.007)	(0.013)	(0.008)	(0.005)	(0.006)	(0.012)	(0.007)	(0.009)	(0.012)
	p=.024	p=.001	p=.303	p=.001	p=.000	p=.757	p=.000	p=.000	p=.707	p=.013	p=.000	p=.024	p=.444	p=.000
	0.019	0.028	-0.007	-0.040	-0.043	0.003	-0.064	0.043	0.002	0.019	-0.182	-0.016	0.012	0.186
6	(0.007)	(0.008)	(0.007)	(0.011)	(0.006)	(0.008)	(0.015)	(0.010)	(0.006)	(0.007)	(0.014)	(0.008)	(0.009)	(0.013)
	p=.016	p=.001	p=.355	p=.001	p=.000	p=.736	p=.000	p=.000	p=.746	p=.014	p=.000	p=.054	p=.199	p=.000
	0.020	0.032	-0.008	-0.044	-0.050	0.004	-0.074	0.050	0.002	0.022	-0.184	-0.017	0.013	0.188
7	(0.008)	(0.008)	(0.008)	(0.012)	(0.006)	(0.010)	(0.017)	(0.011)	(0.007)	(0.009)	(0.015)	(0.009)	(0.010)	(0.014)
	p=.014	p=.001	p=.359	p=.001	p=.000	p=.656	p=.000	p=.000	p=.775	p=.016	p=.000	p=.057	p=.193	p=.000
	0.020	0.033	-0.008	-0.046	-0.057	0.005	-0.084	0.057	0.002	0.026	-0.186	-0.019	0.013	0.192
8	(0.008)	(0.009)	(0.009)	(0.013)	(0.007)	(0.011)	(0.019)	(0.013)	(0.008)	(0.010)	(0.016)	(0.010)	(0.010)	(0.014)
	p=.016	p=.001	p=.426	p=.002	p=.000	p=.635	p=.000	p=.000	p=.823	p=.018	p=.000	p=.050	p=.208	p=.000
	0.020	0.035	-0.008	-0.047	-0.065	0.007	-0.093	0.063	0.001	0.029	-0.186	-0.022	0.015	0.193
9	(0.008)	(0.009)	(0.010)	(0.014)	(0.008)	(0.013)	(0.021)	(0.014)	(0.009)	(0.012)	(0.017)	(0.010)	(0.011)	(0.015)
	p=.021	p=.001	p=.422	p=.002	p=.000	p=.571	p=.000	p=.000	p=.950	p=.022	p=.000	p=.036	p=.196	p=.000

Appendix Table D.6 - Over Time Marginal Effects of Problem Drinking Less than 50% of Period v. Non-Problem Drinking Only

Time Period	Not Em-ployed	Employed < 90% of Period	Employed Part Time > 90% of Period	Employed Full Time > 90% of Period	Conditional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Abstinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
	0.032	0.010	-0.005	-0.037	0.000	0.017	-0.086	0.064	0.012	0.009	0.011	-0.078	0.006	0.061
3	(0.007)	(0.010)	(0.008)	(0.012)	(0.007)	(0.007)	(0.015)	(0.012)	(0.008)	(0.009)	(0.008)	(0.010)	(0.014)	(0.016)
	p=.000	p=.347	p=.522	p=.006	p=.955	p=.028	p=.000	p=.000	p=.142	p=.313	p=.142	p=.000	p=.689	p=.001
	0.046	0.007	-0.008	-0.045	-0.002	0.021	-0.090	0.066	0.013	0.011	0.026	-0.097	0.007	0.064
4	(0.010)	(0.010)	(0.009)	(0.014)	(0.007)	(0.009)	(0.015)	(0.011)	(0.007)	(0.008)	(0.011)	(0.013)	(0.014)	(0.017)
	p=.000	p=.513	p=.434	p=.002	p=.831	p=.022	p=.000	p=.000	p=.078	p=.205	p=.022	p=.000	p=.609	p=.001
	0.051	0.008	-0.008	-0.051	-0.004	0.026	-0.104	0.076	0.016	0.013	0.038	-0.111	0.008	0.065
5	(0.011)	(0.012)	(0.010)	(0.015)	(0.008)	(0.011)	(0.017)	(0.013)	(0.008)	(0.010)	(0.012)	(0.015)	(0.015)	(0.018)
	p=.000	p=.500	p=.439	p=.002	p=.648	p=.018	p=.000	p=.000	p=.056	p=.194	p=.005	p=.000	p=.591	p=.001
	0.055	0.008	-0.009	-0.055	-0.006	0.031	-0.115	0.083	0.017	0.015	0.052	-0.127	0.009	0.066
6	(0.011)	(0.012)	(0.012)	(0.017)	(0.008)	(0.012)	(0.019)	(0.013)	(0.008)	(0.011)	(0.015)	(0.018)	(0.016)	(0.019)
	p=.000	p=.482	p=.471	p=.003	p=.511	p=.015	p=.000	p=.000	p=.052	p=.180	p=.001	p=.000	p=.608	p=.002
	0.056	0.010	-0.009	-0.058	-0.007	0.035	-0.128	0.093	0.019	0.017	0.064	-0.141	0.010	0.068
7	(0.012)	(0.012)	(0.013)	(0.018)	(0.009)	(0.014)	(0.021)	(0.014)	(0.009)	(0.013)	(0.016)	(0.020)	(0.018)	(0.020)
	p=.000	p=.402	p=.492	p=.004	p=.424	p=.014	p=.000	p=.000	p=.054	p=.200	p=.000	p=.000	p=.571	p=.002
	0.056	0.011	-0.009	-0.059	-0.009	0.042	-0.142	0.102	0.021	0.019	0.074	-0.156	0.014	0.069
8	(0.012)	(0.013)	(0.015)	(0.020)	(0.010)	(0.015)	(0.023)	(0.015)	(0.010)	(0.015)	(0.017)	(0.022)	(0.019)	(0.021)
	p=.000	p=.390	p=.566	p=.005	p=.382	p=.011	p=.000	p=.000	p=.052	p=.206	p=.000	p=.000	p=.490	p=.002
	0.058	0.010	-0.008	-0.060	-0.011	0.047	-0.155	0.111	0.023	0.022	0.080	-0.167	0.017	0.070
9	(0.012)	(0.013)	(0.016)	(0.020)	(0.011)	(0.017)	(0.026)	(0.016)	(0.012)	(0.017)	(0.017)	(0.024)	(0.021)	(0.021)
	p=.000	p=.443	p=.609	p=.006	p=.348	p=.010	p=.000	p=.000	p=.066	p=.221	p=.000	p=.000	p=.420	p=.003

Appendix Table D.7 - Over Time Marginal Effects of Problem Drinking More than 50% of Period v. Non-Problem Drinking Only

Time Period	Not Em-ployed	Employed < 90% of Period	Employed Part Time > 90% of Period	Employed Full Time > 90% of Period	Conditional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Abstinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
	0.019	0.007	-0.002	-0.024	0.015	0.012	-0.075	0.071	0.002	0.002	0.001	-0.097	-0.097	0.193
3	(0.006)	(0.010)	(0.007)	(0.011)	(0.005)	(0.007)	(0.014)	(0.012)	(0.007)	(0.008)	(0.008)	(0.011)	(0.013)	(0.016)
	p=.007	p=.484	p=.815	p=.040	p=.006	p=.082	p=.000	p=.000	p=.798	p=.805	p=.943	p=.000	p=.000	p=.000
	0.026	0.005	-0.003	-0.029	0.015	0.014	-0.081	0.074	0.004	0.004	0.009	-0.121	-0.084	0.196
4	(0.009)	(0.010)	(0.009)	(0.013)	(0.005)	(0.008)	(0.014)	(0.011)	(0.007)	(0.008)	(0.011)	(0.014)	(0.013)	(0.017)
	p=.006	p=.618	p=.763	p=.032	p=.009	p=.085	p=.000	p=.000	p=.603	p=.655	p=.423	p=.000	p=.000	p=.000
	0.029	0.006	-0.003	-0.032	0.015	0.017	-0.094	0.085	0.005	0.005	0.022	-0.136	-0.091	0.205
5	(0.010)	(0.012)	(0.010)	(0.015)	(0.006)	(0.010)	(0.017)	(0.013)	(0.008)	(0.009)	(0.013)	(0.016)	(0.015)	(0.019)
	p=.007	p=.606	p=.784	p=.035	p=.015	p=.088	p=.000	p=.000	p=.553	p=.634	p=.092	p=.000	p=.000	p=.000
	0.031	0.007	-0.003	-0.035	0.016	0.020	-0.105	0.095	0.005	0.005	0.034	-0.155	-0.090	0.211
6	(0.011)	(0.013)	(0.012)	(0.017)	(0.007)	(0.011)	(0.018)	(0.014)	(0.008)	(0.011)	(0.015)	(0.019)	(0.016)	(0.020)
	p=.008	p=.608	p=.828	p=.045	p=.024	p=.088	p=.000	p=.000	p=.559	p=.644	p=.027	p=.000	p=.000	p=.000
	0.031	0.008	-0.003	-0.037	0.017	0.023	-0.118	0.108	0.005	0.005	0.047	-0.171	-0.093	0.218
7	(0.011)	(0.014)	(0.013)	(0.018)	(0.008)	(0.013)	(0.021)	(0.015)	(0.009)	(0.013)	(0.016)	(0.021)	(0.017)	(0.021)
	p=.010	p=.562	p=.850	p=.056	p=.035	p=.087	p=.000	p=.000	p=.605	p=.684	p=.007	p=.000	p=.000	p=.000
	0.031	0.008	-0.002	-0.037	0.018	0.027	-0.130	0.119	0.005	0.006	0.058	-0.189	-0.094	0.225
8	(0.012)	(0.014)	(0.015)	(0.020)	(0.009)	(0.015)	(0.023)	(0.016)	(0.010)	(0.016)	(0.017)	(0.024)	(0.019)	(0.022)
	p=.013	p=.563	p=.903	p=.071	p=.046	p=.084	p=.000	p=.000	p=.632	p=.701	p=.002	p=.000	p=.000	p=.000
	0.031	0.008	-0.002	-0.037	0.020	0.030	-0.141	0.131	0.004	0.006	0.066	-0.200	-0.097	0.231
9	(0.012)	(0.015)	(0.017)	(0.021)	(0.010)	(0.017)	(0.026)	(0.017)	(0.012)	(0.018)	(0.018)	(0.026)	(0.021)	(0.022)
	p=.016	p=.612	p=.896	p=.088	p=.055	p=.079	p=.000	p=.000	p=.759	p=.747	p=.001	p=.000	p=.000	p=.000

Appendix Table D.8 - Over Time Marginal Effects of Problem Drinking Less than 50% of Period v. Problem Drinking More than 50% of Period

Time Period	Not Em-ployed	Employed < 90% of Period	Employed Part Time > 90% of Period	Employed Full Time > 90% of Period	Conditional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Abstinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
	-0.014	-0.003	0.004	0.013	0.015	-0.005	0.011	0.007	-0.010	-0.007	-0.011	-0.019	-0.102	0.132
3	(0.004)	(0.006)	(0.004)	(0.007)	(0.004)	(0.004)	(0.007)	(0.005)	(0.004)	(0.004)	(0.005)	(0.004)	(0.007)	(0.008)
	p=.001	p=.622	p=.394	p=.061	p=.001	p=.180	p=.128	p=.217	p=.017	p=.122	p=.051	p=.000	p=.000	p=.000
	-0.020	-0.002	0.005	0.017	0.017	-0.007	0.010	0.007	-0.010	-0.007	-0.017	-0.024	-0.091	0.133
4	(0.006)	(0.006)	(0.005)	(0.008)	(0.005)	(0.005)	(0.008)	(0.006)	(0.004)	(0.004)	(0.008)	(0.005)	(0.007)	(0.009)
	p=.002	p=.790	p=.333	p=.043	p=.001	p=.153	p=.225	p=.210	p=.021	p=.112	p=.030	p=.000	p=.000	p=.000
	-0.022	-0.002	0.005	0.018	0.019	-0.009	0.010	0.010	-0.011	-0.008	-0.016	-0.026	-0.099	0.141
5	(0.007)	(0.007)	(0.005)	(0.009)	(0.005)	(0.006)	(0.009)	(0.007)	(0.005)	(0.005)	(0.009)	(0.005)	(0.008)	(0.010)
	p=.002	p=.819	p=.326	p=.052	p=.001	p=.150	p=.285	p=.162	p=.022	p=.124	p=.074	p=.000	p=.000	p=.000
	-0.024	-0.002	0.006	0.020	0.022	-0.011	0.010	0.012	-0.012	-0.010	-0.018	-0.028	-0.099	0.145
6	(0.007)	(0.008)	(0.006)	(0.010)	(0.005)	(0.007)	(0.010)	(0.008)	(0.005)	(0.006)	(0.010)	(0.006)	(0.008)	(0.011)
	p=.002	p=.810	p=.337	p=.059	p=.000	p=.142	p=.348	p=.134	p=.025	p=.114	p=.086	p=.000	p=.000	p=.000
	-0.025	-0.003	0.007	0.021	0.024	-0.013	0.010	0.015	-0.014	-0.011	-0.017	-0.030	-0.103	0.150
7	(0.008)	(0.008)	(0.007)	(0.011)	(0.006)	(0.008)	(0.012)	(0.009)	(0.006)	(0.007)	(0.011)	(0.006)	(0.009)	(0.012)
	p=.003	p=.768	p=.350	p=.067	p=.000	p=.142	p=.386	p=.100	p=.027	p=.122	p=.131	p=.000	p=.000	p=.000
	-0.026	-0.003	0.007	0.022	0.027	-0.015	0.012	0.018	-0.016	-0.013	-0.016	-0.032	-0.108	0.156
8	(0.008)	(0.009)	(0.008)	(0.012)	(0.007)	(0.010)	(0.013)	(0.010)	(0.007)	(0.008)	(0.012)	(0.007)	(0.009)	(0.013)
	p=.003	p=.771	p=.401	p=.076	p=.000	p=.128	p=.378	p=.083	p=.026	p=.124	p=.175	p=.000	p=.000	p=.000
	-0.027	-0.002	0.006	0.023	0.030	-0.017	0.014	0.021	-0.019	-0.016	-0.014	-0.033	-0.114	0.161
9	(0.008)	(0.009)	(0.009)	(0.012)	(0.007)	(0.011)	(0.014)	(0.011)	(0.008)	(0.010)	(0.012)	(0.008)	(0.010)	(0.014)
	p=.003	p=.805	p=.485	p=.070	p=.000	p=.128	p=.335	p=.067	p=.025	p=.121	p=.270	p=.000	p=.000	p=.000

Appendix Table D.9. Marginal Effect of Lagged Employment Status Following COMBINE Treatment

Lagged Employment Status During COMBINE Treatment and All Periods Following Combined Treatment		Not Em-ployed	Em-ployed < 90% of Period	Em-ployed Part Time >90% of Period	Em-ployed Full Time >90% of Period	Condi-tional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Abst-inent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
Average Outcome															
Not Employed		0.234	0.198	0.109	0.458	2.780	0.166	0.685	0.166	0.077	0.072	0.267	0.097	0.225	0.410
Employed < 90% of Period		0.169	0.224	0.125	0.482	2.806	0.155	0.697	0.161	0.071	0.072	0.290	0.098	0.229	0.383
Employed Part Time > 90% of Period		0.149	0.186	0.201	0.464	2.848	0.160	0.687	0.166	0.078	0.070	0.287	0.093	0.224	0.395
Employed Full Time > 90% of Period		0.142	0.162	0.105	0.591	2.828	0.162	0.692	0.163	0.077	0.067	0.279	0.098	0.221	0.401
Marginal Effects															
	Relative To														
Employed < 90% of Period	Not Employed	-0.065	0.025	0.016	0.024	0.026	-0.011	0.012	-0.005	-0.007	0.000	0.023	0.001	0.004	-0.027
		(0.006)	(0.007)	(0.006)	(0.008)	(0.007)	(0.004)	(0.006)	(0.005)	(0.005)	(0.004)	(0.006)	(0.005)	(0.006)	(0.007)
		p=.000	p=.000	p=.010	p=.002	p=.001	p=.015	p=.056	p=.311	p=.158	p=.943	p=.001	p=.914	p=.505	p=.000
Employed Part Time > 90% of Period		-0.085	-0.013	0.092	0.006	0.068	-0.006	0.002	0.000	0.000	-0.002	0.020	-0.004	-0.001	-0.015
		(0.005)	(0.007)	(0.007)	(0.008)	(0.006)	(0.004)	(0.007)	(0.005)	(0.004)	(0.004)	(0.005)	(0.004)	(0.006)	(0.006)
		p=.000	p=.067	p=.000	p=.505	p=.000	p=.095	p=.764	p=.943	p=.945	p=.609	p=.000	p=.312	p=.897	p=.009
Employed Full Time > 90% of Period		-0.092	-0.036	-0.004	0.133	0.047	-0.004	0.008	-0.003	0.000	-0.004	0.013	0.001	-0.004	-0.009
		(0.004)	(0.005)	(0.004)	(0.006)	(0.006)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)
		p=.000	p=.000	p=.266	p=.000	p=.000	p=.147	p=.052	p=.362	p=.960	p=.110	p=.001	p=.784	p=.297	p=.040

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Appendix Table D.9 (Continued). Marginal Effect of Lagged Employment Status Following COMBINE Treatment

Lagged Employment Status During COMBINE Treatment and All Periods Following Combined Treatment		Not Em-ployed	Em-ployed < 90% of Period	Em-ployed Part Time >90% of Period	Em-ployed Full Time >90% of Period	Condi-tional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Absti-nent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
	Relative to:														
Marginal Effects															
Employed Part Time > 90% of Period	Employed < 90% of Period	-0.020	-0.038	0.076	-0.018	0.042	0.005	-0.010	0.005	0.007	-0.002	-0.003	-0.005	-0.005	0.012
		(0.005)	(0.007)	(0.007)	(0.007)	(0.006)	(0.005)	(0.007)	(0.006)	(0.004)	(0.004)	(0.007)	(0.005)	(0.007)	(0.008)
		p=.000	p=.000	p=.000	p=.013	p=.000	p=.328	p=.178	p=.403	p=.102	p=.671	p=.672	p=.404	p=.484	p=.111
Employed Full Time > 90% of Period		-0.027	-0.062	-0.020	0.109	0.021	0.007	-0.004	0.002	0.007	-0.004	-0.010	0.000	-0.008	0.018
		(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.005)	(0.004)	(0.003)	(0.003)	(0.005)	(0.004)	(0.005)	(0.006)
		p=.000	p=.000	p=.000	p=.000	p=.000	p=.049	p=.351	p=.647	p=.049	p=.129	p=.060	p=.937	p=.105	p=.002
Marginal Effects															
Employed Full Time > 90% of Period	Employed Part Time > 90% of Period	-0.007	-0.024	-0.097	0.127	-0.021	0.002	0.006	-0.003	0.000	-0.003	-0.007	0.005	-0.003	0.006
		(0.004)	(0.005)	(0.005)	(0.006)	(0.004)	(0.004)	(0.005)	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)	(0.005)	(0.004)
		p=.092	p=.000	p=.000	p=.000	p=.000	p=.543	p=.311	p=.497	p=.968	p=.376	p=.070	p=.154	p=.514	p=.191

Appendix Table D.10. Marginal Effect of Lagged Employment Status Following COMBINE Treatment - Estimated without controlling for unobserved heterogeneity

Lagged Employment Status During COMBINE Treatment and All Periods Following Combined Treatment		Not Em-ployed	Em-ployed < 90% of Period	Em-ployed Part Time >90% of Period	Em-ployed Full Time >90% of Period	Condi-tional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Abstinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
Average Outcome															
Not Employed		0.237	0.200	0.109	0.455	2.779	0.157	0.684	0.170	0.077	0.069	0.271	0.097	0.226	0.405
Employed < 90% of Period		0.169	0.226	0.123	0.482	2.771	0.150	0.698	0.162	0.071	0.069	0.289	0.098	0.232	0.381
Employed Part Time > 90% of Period		0.152	0.193	0.188	0.467	2.847	0.149	0.688	0.166	0.078	0.068	0.280	0.094	0.231	0.396
Employed Full Time > 90% of Period		0.144	0.161	0.102	0.593	2.855	0.152	0.692	0.165	0.076	0.066	0.278	0.099	0.223	0.400
Marginal Effects															
	Relative To														
Employed < 90% of Period	Not Employed	-0.068	0.027	0.014	0.027	-0.008	-0.008	0.014	-0.008	-0.006	0.000	0.018	0.001	0.006	-0.024
		(0.005)	(0.007)	(0.006)	(0.009)	(0.016)	(0.004)	(0.007)	(0.005)	(0.005)	(0.004)	(0.006)	(0.005)	(0.006)	(0.007)
		p=.000	p=.000	p=.024	p=.002	p=.589	p=.060	p=.041	p=.106	p=.209	p=.998	p=.001	p=.891	p=.362	p=.001
Employed Part Time > 90% of Period		-0.084	-0.007	0.079	0.012	0.068	-0.009	0.004	-0.004	0.001	-0.001	0.008	-0.004	0.004	-0.009
		(0.005)	(0.006)	(0.005)	(0.008)	(0.014)	(0.004)	(0.006)	(0.005)	(0.004)	(0.003)	(0.006)	(0.004)	(0.006)	(0.007)
		p=.000	p=.269	p=.000	p=.112	p=.000	p=.035	p=.505	p=.431	p=.775	p=.802	p=.182	p=.292	p=.462	p=.197
Employed Full Time > 90% of Period		-0.093	-0.038	-0.007	0.138	0.076	-0.006	0.008	-0.004	-0.001	-0.003	0.007	0.001	-0.003	-0.005
		(0.004)	(0.005)	(0.004)	(0.006)	(0.010)	(0.003)	(0.004)	(0.003)	(0.003)	(0.002)	(0.004)	(0.002)	(0.005)	(0.005)
		p=.000	p=.000	p=.080	p=.000	p=.000	p=.053	p=.080	p=.187	p=.765	p=.285	p=.094	p=.581	p=.490	p=.314

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Appendix Table D.10 (Continued). Marginal Effect of Lagged Employment Status Following COMBINE Treatment - Estimated w/o controlling for unobserved heterogeneity

Lagged Employment Status During COMBINE Treatment and All Periods Following Combined Treatment		Not Em-ployed	Em-ployed < 90% of Period	Em-ployed Part Time >90% of Period	Em-ployed Full Time >90% of Period	Condi-tional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Abstinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
Marginal Effects															
Employed Part Time > 90% of Period	Employed < 90% of Period	-0.017	-0.034	0.065	-0.015	0.074	-0.001	-0.010	0.004	0.007	-0.001	-0.010	-0.004	-0.002	0.016
		(0.006)	(0.007)	(0.005)	(0.008)	(0.015)	(0.004)	(0.007)	(0.006)	(0.004)	(0.004)	(0.007)	(0.006)	(0.007)	(0.007)
		p=.003	p=.000	p=.000	p=.056	p=.000	p=.829	p=.193	p=.536	p=.124	p=.829	p=.136	p=.428	p=.813	p=.033
Employed Full Time > 90% of Period		-0.025	-0.065	-0.021	0.111	0.082	0.002	-0.006	0.003	0.005	-0.003	-0.012	0.001	-0.009	0.020
		(0.004)	(0.005)	(0.004)	(0.005)	(0.010)	(0.004)	(0.005)	(0.004)	(0.004)	(0.003)	(0.005)	(0.004)	(0.005)	(0.005)
		p=.000	p=.000	p=.000	p=.000	p=.000	p=.584	p=.292	p=.339	p=.168	p=.398	p=.013	p=.879	p=.072	p=.000
Marginal Effects															
Employed Full Time > 90% of Period	Employed Part Time > 90% of Period	-0.009	-0.031	-0.086	0.126	0.008	0.003	0.004	0.000	-0.002	-0.002	-0.002	0.005	-0.007	0.004
		(0.004)	(0.005)	(0.004)	(0.006)	(0.011)	(0.004)	(0.006)	(0.005)	(0.003)	(0.003)	(0.005)	(0.003)	(0.005)	(0.006)
		p=.045	p=.000	p=.000	p=.000	p=.433	p=.392	p=.479	p=.964	p=.552	p=.509	p=.745	p=.148	p=.179	p=.517

Appendix Table D.11. Marginal Effect of Each COMBINE Treatment Arm On Outcomes Following COMBINE Treatment

COMBINE Treatment Arm	Not Em-ployed	Em-ployed < 90% of Period	Em-ployed Part Time >90% of Period	Em-ployed Full Time >90% of Period	Condi-tional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Ab-stinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
Average Outcome														
MM Only	0.131	0.181	0.124	0.564	3.090	0.126	0.684	0.143	0.063	0.109	0.306	0.115	0.224	0.355
Acam + MM	0.144	0.167	0.170	0.520	2.929	0.170	0.642	0.137	0.079	0.141	0.341	0.111	0.187	0.361
Nalt + MM	0.183	0.187	0.136	0.495	2.828	0.184	0.514	0.256	0.070	0.159	0.325	0.078	0.258	0.339
Acam + Nalt+ MM	0.163	0.194	0.111	0.532	2.896	0.155	0.586	0.201	0.079	0.134	0.366	0.087	0.224	0.323
MM + CBI	0.160	0.196	0.124	0.520	2.641	0.173	0.625	0.202	0.080	0.092	0.325	0.099	0.214	0.362
Acam + MM + CBI	0.172	0.176	0.121	0.531	2.834	0.159	0.620	0.183	0.094	0.103	0.283	0.116	0.250	0.351
Nalt + MM+ CBI	0.154	0.166	0.145	0.535	2.858	0.180	0.642	0.121	0.077	0.159	0.277	0.118	0.207	0.398
Acam + Nalt + MM + CBI	0.137	0.179	0.106	0.579	2.815	0.212	0.651	0.124	0.100	0.125	0.324	0.096	0.200	0.380
CBI Only	0.155	0.185	0.132	0.528	2.908	0.157	0.606	0.219	0.103	0.072	0.301	0.099	0.232	0.367

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Appendix Table D.11 (Continued). Marginal Effect of Each COMBINE Treatment Arm On Outcomes Following COMBINE Treatment

COMBINE Treatment Arm	Not Em-ployed	Em-ployed < 90% of Period	Em-ployed Part Time >90% of Period	Em-ployed Full Time >90% of Period	Condi-tional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Ab- stinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
Marginal Effects Relative To: *MM Only*														
Acam + MM	0.013	-0.015	0.046	-0.045	-0.160	0.044	-0.042	-0.006	0.016	0.032	0.035	-0.004	-0.037	0.006
	(0.018)	(0.032)	(0.026)	(0.041)	(0.023)	(0.024)	(0.040)	(0.025)	(0.022)	(0.022)	(0.033)	(0.029)	(0.026)	(0.034)
	p=.447	p=.646	p=.075	p=.282	p=.000	p=.067	p=.301	p=.805	p=.467	p=.149	p=.292	p=.886	p=.164	p=.855
Nalt + MM	0.052	0.005	0.012	-0.070	-0.262	0.058	-0.170	0.113	0.007	0.050	0.019	-0.037	0.034	-0.016
	(0.024)	(0.037)	(0.027)	(0.044)	(0.026)	(0.026)	(0.036)	(0.030)	(0.018)	(0.023)	(0.037)	(0.032)	(0.032)	(0.031)
	p=.029	p=.888	p=.655	p=.113	p=.000	p=.025	p=.000	p=.000	p=.688	p=.032	p=.609	p=.243	p=.293	p=.609
Acam + Nalt+ MM	0.033	0.013	-0.013	-0.033	-0.194	0.029	-0.098	0.057	0.015	0.025	0.059	-0.028	0.001	-0.032
	(0.022)	(0.037)	(0.025)	(0.043)	(0.021)	(0.029)	(0.042)	(0.030)	(0.018)	(0.023)	(0.035)	(0.028)	(0.028)	(0.035)
	p=.134	p=.727	p=.608	p=.455	p=.000	p=.326	p=.021	p=.055	p=.391	p=.267	p=.092	p=.313	p=.986	p=.367
MM + CBI	0.029	0.015	0.001	-0.045	-0.449	0.047	-0.059	0.059	0.017	-0.017	0.019	-0.016	-0.010	0.007
	(0.023)	(0.034)	(0.026)	(0.044)	(0.023)	(0.026)	(0.042)	(0.031)	(0.021)	(0.023)	(0.040)	(0.032)	(0.032)	(0.033)
	p=.210	p=.669	p=.973	p=.310	p=.000	p=.073	p=.165	p=.059	p=.422	p=.458	p=.635	p=.614	p=.766	p=.836
Acam + MM + CBI	0.042	-0.006	-0.003	-0.033	-0.256	0.033	-0.064	0.039	0.031	-0.006	-0.024	0.001	0.026	-0.003
	(0.023)	(0.035)	(0.024)	(0.042)	(0.022)	(0.025)	(0.041)	(0.028)	(0.020)	(0.024)	(0.034)	(0.031)	(0.029)	(0.038)
	p=.077	p=.871	p=.897	p=.436	p=.000	p=.204	p=.126	p=.166	p=.136	p=.810	p=.484	p=.978	p=.372	p=.931
Nalt + MM+ CBI	0.023	-0.015	0.021	-0.029	-0.232	0.054	-0.042	-0.022	0.014	0.050	-0.029	0.002	-0.017	0.044
	(0.022)	(0.033)	(0.022)	(0.036)	(0.024)	(0.025)	(0.037)	(0.024)	(0.018)	(0.023)	(0.030)	(0.032)	(0.027)	(0.034)
	p=.290	p=.647	p=.345	p=.416	p=.000	p=.031	p=.255	p=.356	p=.430	p=.029	p=.336	p=.941	p=.530	p=.207
Acam + Nalt + MM + CBI	0.006	-0.003	-0.018	0.014	-0.275	0.086	-0.033	-0.020	0.037	0.016	0.018	-0.019	-0.024	0.025
	(0.025)	(0.035)	(0.027)	(0.039)	(0.023)	(0.027)	(0.039)	(0.025)	(0.022)	(0.024)	(0.036)	(0.032)	(0.031)	(0.038)
	p=.800	p=.937	p=.516	p=.716	p=.000	p=.002	p=.403	p=.442	p=.096	p=.517	p=.626	p=.554	p=.446	p=.509
CBI Only	0.025	0.004	0.008	-0.037	-0.182	0.031	-0.078	0.076	0.040	-0.037	-0.005	-0.016	0.009	0.012
	(0.022)	(0.037)	(0.023)	(0.041)	(0.025)	(0.021)	(0.038)	(0.029)	(0.017)	(0.020)	(0.040)	(0.032)	(0.031)	(0.034)
	p=.257	p=.922	p=.712	p=.374	p=.000	p=.138	p=.041	p=.011	p=.025	p=.074	p=.900	p=.616	p=.783	p=.714

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Appendix Table D.11 (Continued). Marginal Effect of Each COMBINE Treatment Arm On Outcomes Following COMBINE Treatment

COMBINE Treatment Arm	Not Em-ployed	Em-ployed < 90% of Period	Em-ployed Part Time >90% of Period	Em-ployed Full Time >90% of Period	Condi-tional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Ab-stinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
Marginal Effects Relative To: *Acam + MM*														
Nalt + MM	0.039	0.020	-0.034	-0.025	-0.101	0.014	-0.128	0.119	-0.009	0.018	-0.016	-0.033	0.071	-0.022
	(0.022)	(0.024)	(0.024)	(0.027)	(0.031)	(0.026)	(0.031)	(0.028)	(0.018)	(0.016)	(0.036)	(0.024)	(0.027)	(0.030)
	p=.083	p=.402	p=.158	p=.355	p=.001	p=.593	p=.000	p=.000	p=.628	p=.259	p=.661	p=.174	p=.009	p=.466
Acam + Nalt+ MM	0.019	0.028	-0.059	0.012	-0.033	-0.015	-0.056	0.064	-0.001	-0.007	0.025	-0.024	0.037	-0.038
	(0.021)	(0.022)	(0.025)	(0.029)	(0.028)	(0.026)	(0.036)	(0.026)	(0.018)	(0.018)	(0.033)	(0.022)	(0.022)	(0.031)
	p=.368	p=.223	p=.020	p=.677	p=.242	p=.552	p=.126	p=.017	p=.971	p=.718	p=.460	p=.267	p=.092	p=.225
MM + CBI	0.016	0.029	-0.045	0.000	-0.289	0.002	-0.018	0.065	0.001	-0.049	-0.016	-0.012	0.027	0.001
	(0.026)	(0.021)	(0.025)	(0.029)	(0.024)	(0.023)	(0.036)	(0.027)	(0.020)	(0.022)	(0.034)	(0.024)	(0.026)	(0.031)
	p=.543	p=.166	p=.069	p=.999	p=.000	p=.922	p=.631	p=.018	p=.951	p=.025	p=.641	p=.623	p=.303	p=.984
Acam + MM + CBI	0.028	0.009	-0.049	0.012	-0.095	-0.012	-0.022	0.045	0.015	-0.038	-0.059	0.005	0.063	-0.010
	(0.023)	(0.020)	(0.023)	(0.028)	(0.026)	(0.024)	(0.037)	(0.023)	(0.019)	(0.019)	(0.031)	(0.024)	(0.027)	(0.030)
	p=.211	p=.652	p=.037	p=.678	p=.000	p=.620	p=.546	p=.056	p=.432	p=.055	p=.064	p=.832	p=.023	p=.755
Nalt + MM+ CBI	0.010	-0.001	-0.025	0.016	-0.071	0.010	0.000	-0.016	-0.002	0.018	-0.064	0.007	0.020	0.037
	(0.023)	(0.021)	(0.021)	(0.029)	(0.028)	(0.024)	(0.037)	(0.024)	(0.020)	(0.019)	(0.029)	(0.023)	(0.023)	(0.029)
	p=.659	p=.973	p=.247	p=.586	p=.012	p=.695	p=.995	p=.508	p=.925	p=.343	p=.028	p=.781	p=.391	p=.208
Acam + Nalt + MM + CBI	-0.007	0.012	-0.064	0.059	-0.115	0.042	0.009	-0.013	0.021	-0.016	-0.017	-0.015	0.013	0.019
	(0.027)	(0.021)	(0.023)	(0.029)	(0.027)	(0.026)	(0.034)	(0.020)	(0.022)	(0.019)	(0.031)	(0.023)	(0.023)	(0.029)
	p=.791	p=.573	p=.006	p=.042	p=.000	p=.113	p=.794	p=.499	p=.350	p=.391	p=.578	p=.507	p=.561	p=.522
CBI Only	0.011	0.018	-0.038	0.008	-0.021	-0.013	-0.037	0.082	0.024	-0.069	-0.040	-0.012	0.045	0.006
	(0.025)	(0.020)	(0.024)	(0.030)	(0.028)	(0.021)	(0.038)	(0.026)	(0.021)	(0.020)	(0.035)	(0.026)	(0.023)	(0.033)
	p=.650	p=.366	p=.124	p=.792	p=.447	p=.546	p=.335	p=.002	p=.257	p=.001	p=.260	p=.652	p=.052	p=.851

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Appendix Table D.11 (Continued). Marginal Effect of Each COMBINE Treatment Arm On Outcomes Following COMBINE Treatment

COMBINE Treatment Arm	Not Em-ployed	Em-ployed < 90% of Period	Em-ployed Part Time >90% of Period	Em-ployed Full Time >90% of Period	Condi-tional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out- patient Therapy (No RxT)	RxT	Ab-stinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
Marginal Effects Relative To: *Nalt + MM*														
Acam + Nalt+ MM	-0.020	0.008	-0.025	0.037	0.068	-0.029	0.072	-0.056	0.008	-0.024	0.040	0.009	-0.033	-0.016
	(0.026)	(0.021)	(0.027)	(0.030)	(0.029)	(0.027)	(0.035)	(0.034)	(0.018)	(0.018)	(0.040)	(0.021)	(0.028)	(0.026)
	p=.453	p=.717	p=.352	p=.216	p=.021	p=.280	p=.044	p=.101	p=.657	p=.177	p=.316	p=.668	p=.243	p=.549
MM + CBI	-0.023	0.009	-0.011	0.025	-0.188	-0.012	0.110	-0.054	0.010	-0.067	0.000	0.021	-0.044	0.023
	(0.031)	(0.026)	(0.026)	(0.032)	(0.026)	(0.025)	(0.037)	(0.032)	(0.019)	(0.021)	(0.043)	(0.025)	(0.028)	(0.027)
	p=.465	p=.716	p=.665	p=.440	p=.000	p=.640	p=.003	p=.093	p=.591	p=.002	p=.995	p=.407	p=.118	p=.392
Acam + MM + CBI	-0.010	-0.011	-0.015	0.037	0.006	-0.026	0.106	-0.074	0.024	-0.056	-0.043	0.038	-0.008	0.013
	(0.027)	(0.024)	(0.023)	(0.029)	(0.027)	(0.025)	(0.035)	(0.028)	(0.017)	(0.019)	(0.034)	(0.022)	(0.031)	(0.032)
	p=.695	p=.655	p=.496	p=.212	p=.829	p=.306	p=.003	p=.009	p=.168	p=.004	p=.205	p=.087	p=.799	p=.692
Nalt + MM+ CBI	-0.029	-0.021	0.009	0.041	0.030	-0.004	0.128	-0.135	0.007	0.000	-0.048	0.039	-0.051	0.060
	(0.023)	(0.024)	(0.023)	(0.032)	(0.028)	(0.024)	(0.036)	(0.029)	(0.017)	(0.020)	(0.030)	(0.022)	(0.027)	(0.026)
	p=.204	p=.400	p=.707	p=.205	p=.277	p=.860	p=.001	p=.000	p=.689	p=.991	p=.109	p=.075	p=.063	p=.024
Acam + Nalt + MM + CBI	-0.046	-0.008	-0.030	0.084	-0.014	0.028	0.137	-0.132	0.030	-0.034	-0.001	0.018	-0.057	0.041
	(0.032)	(0.025)	(0.026)	(0.030)	(0.029)	(0.028)	(0.036)	(0.029)	(0.021)	(0.022)	(0.038)	(0.024)	(0.028)	(0.030)
	p=.149	p=.755	p=.252	p=.007	p=.631	p=.332	p=.000	p=.000	p=.154	p=.117	p=.973	p=.456	p=.043	p=.172
CBI Only	-0.028	-0.002	-0.004	0.033	0.080	-0.027	0.091	-0.037	0.033	-0.087	-0.024	0.021	-0.025	0.028
	(0.024)	(0.025)	(0.023)	(0.032)	(0.029)	(0.024)	(0.037)	(0.032)	(0.019)	(0.020)	(0.037)	(0.023)	(0.029)	(0.028)
	p=.253	p=.953	p=.866	p=.309	p=.007	p=.269	p=.016	p=.246	p=.091	p=.000	p=.512	p=.362	p=.382	p=.306

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Appendix Table D.11 (Continued). Marginal Effect of Each COMBINE Treatment Arm On Outcomes Following COMBINE Treatment

COMBINE Treatment Arm	Not Em-ployed	Em-ployed < 90% of Period	Em- ployed Part Time >90% of Period	Em-ployed Full Time >90% of Period	Condi-tional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Ab- stinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
Marginal Effects Relative To: *Acam + Nalt+ MM*														
MM + CBI	-0.004	0.002	0.014	-0.012	-0.256	0.018	0.039	0.002	0.002	-0.042	-0.041	0.012	-0.010	0.039
	(0.029)	(0.024)	(0.022)	(0.031)	(0.027)	(0.024)	(0.042)	(0.031)	(0.020)	(0.021)	(0.037)	(0.023)	(0.027)	(0.025)
	p=.902	p=.942	p=.533	p=.698	p=.000	p=.469	p=.355	p=.959	p=.925	p=.044	p=.280	p=.601	p=.703	p=.130
Acam + MM + CBI	0.009	-0.019	0.010	0.000	-0.062	0.004	0.034	-0.018	0.015	-0.031	-0.083	0.029	0.026	0.028
	(0.026)	(0.024)	(0.025)	(0.030)	(0.025)	(0.025)	(0.042)	(0.026)	(0.022)	(0.022)	(0.034)	(0.020)	(0.028)	(0.032)
	p=.730	p=.435	p=.692	p=.991	p=.016	p=.882	p=.423	p=.484	p=.485	p=.150	p=.016	p=.155	p=.365	p=.370
Nalt + MM+ CBI	-0.009	-0.028	0.034	0.004	-0.038	0.025	0.056	-0.079	-0.001	0.025	-0.088	0.031	-0.017	0.075
	(0.025)	(0.022)	(0.024)	(0.031)	(0.027)	(0.025)	(0.033)	(0.027)	(0.018)	(0.018)	(0.033)	(0.022)	(0.024)	(0.029)
	p=.701	p=.207	p=.152	p=.910	p=.169	p=.324	p=.089	p=.004	p=.945	p=.182	p=.009	p=.168	p=.471	p=.010
Acam + Nalt + MM + CBI	-0.026	-0.016	-0.005	0.047	-0.082	0.057	0.065	-0.077	0.022	-0.010	-0.042	0.009	-0.024	0.057
	(0.031)	(0.025)	(0.025)	(0.032)	(0.028)	(0.031)	(0.039)	(0.028)	(0.021)	(0.020)	(0.038)	(0.021)	(0.027)	(0.033)
	p=.402	p=.538	p=.851	p=.152	p=.004	p=.066	p=.101	p=.008	p=.312	p=.630	p=.275	p=.674	p=.380	p=.084
CBI Only	-0.008	-0.009	0.021	-0.004	0.012	0.003	0.020	0.018	0.024	-0.062	-0.064	0.012	0.008	0.044
	(0.023)	(0.022)	(0.024)	(0.034)	(0.029)	(0.027)	(0.045)	(0.034)	(0.021)	(0.022)	(0.042)	(0.024)	(0.024)	(0.028)
	p=.731	p=.674	p=.370	p=.905	p=.685	p=.928	p=.665	p=.593	p=.242	p=.007	p=.127	p=.610	p=.739	p=.112
Marginal Effects Relative to MM+ CBI														
Acam + MM + CBI	0.013	-0.020	-0.004	0.012	0.194	-0.014	-0.005	-0.020	0.013	0.011	-0.043	0.017	0.036	-0.010
	(0.031)	(0.023)	(0.023)	(0.025)	(0.027)	(0.023)	(0.037)	(0.028)	(0.019)	(0.024)	(0.037)	(0.023)	(0.029)	(0.031)
	p=.682	p=.387	p=.864	p=.643	p=.000	p=.549	p=.900	p=.487	p=.480	p=.642	p=.255	p=.460	p=.220	p=.742
Nalt + MM+ CBI	-0.006	-0.030	0.020	0.016	0.218	0.007	0.017	-0.081	-0.003	0.067	-0.048	0.018	-0.007	0.037
	(0.030)	(0.023)	(0.024)	(0.029)	(0.023)	(0.023)	(0.037)	(0.027)	(0.018)	(0.021)	(0.037)	(0.023)	(0.024)	(0.027)
	p=.845	p=.194	p=.391	p=.589	p=.000	p=.750	p=.647	p=.004	p=.861	p=.002	p=.199	p=.426	p=.761	p=.178
Acam + Nalt + MM + CBI	-0.023	-0.017	-0.019	0.059	0.174	0.039	0.026	-0.078	0.020	0.033	-0.001	-0.003	-0.014	0.018
	(0.028)	(0.025)	(0.022)	(0.030)	(0.022)	(0.028)	(0.038)	(0.025)	(0.020)	(0.025)	(0.036)	(0.023)	(0.026)	(0.031)
	p=.420	p=.480	p=.394	p=.051	p=.000	p=.170	p=.491	p=.003	p=.333	p=.192	p=.977	p=.887	p=.590	p=.554
CBI Only	-0.005	-0.011	0.008	0.008	0.268	-0.015	-0.019	0.017	0.023	-0.020	-0.024	0.000	0.018	0.006
	(0.027)	(0.021)	(0.022)	(0.030)	(0.025)	(0.025)	(0.041)	(0.029)	(0.020)	(0.020)	(0.032)	(0.022)	(0.024)	(0.026)
	p=.869	p=.608	p=.738	p=.792	p=.000	p=.544	p=.639	p=.573	p=.263	p=.331	p=.452	p=.996	p=.448	p=.835

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Appendix Table D.11 (Continued). Marginal Effect of Each COMBINE Treatment Arm On Outcomes Following COMBINE Treatment

COMBINE Treatment Arm	Not Em-ployed	Em- ployed < 90% of Period	Em-ployed Part Time >90% of Period	Em-ployed Full Time >90% of Period	Condi-tional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Ab-stinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
Marginal Effects Relative To: *Acam + MM+CBI*														
Nalt + MM+ CBI	-0.019	-0.010	0.024	0.004	0.024	0.021	0.022	-0.061	-0.017	0.056	-0.005	0.002	-0.043	0.047
	(0.029)	(0.022)	(0.023)	(0.030)	(0.024)	(0.025)	(0.034)	(0.024)	(0.018)	(0.021)	(0.030)	(0.021)	(0.026)	(0.030)
	p=.518	p=.666	p=.294	p=.896	p=.322	p=.394	p=.519	p=.011	p=.365	p=.009	p=.860	p=.942	p=.096	p=.115
Acam + Nalt + MM + CBI	-0.036	0.003	-0.015	0.047	-0.020	0.053	0.031	-0.059	0.006	0.022	0.042	-0.020	-0.050	0.028
	(0.029)	(0.022)	(0.023)	(0.029)	(0.026)	(0.028)	(0.034)	(0.022)	(0.019)	(0.023)	(0.032)	(0.022)	(0.029)	(0.033)
	p=.216	p=.891	p=.532	p=.103	p=.449	p=.057	p=.360	p=.009	p=.741	p=.358	p=.193	p=.370	p=.093	p=.399
CBI Only	-0.017	0.009	0.012	-0.004	0.074	-0.001	-0.015	0.036	0.009	-0.031	0.019	-0.017	-0.018	0.016
	(0.023)	(0.023)	(0.020)	(0.026)	(0.027)	(0.026)	(0.041)	(0.031)	(0.019)	(0.023)	(0.035)	(0.022)	(0.028)	(0.030)
	p=.468	p=.679	p=.569	p=.883	p=.008	p=.962	p=.723	p=.235	p=.640	p=.179	p=.595	p=.455	p=.528	p=.607
Marginal Effects Relative To: Nalt+MM+CBI														
Acam + Nalt + MM + CBI	-0.017	0.013	-0.039	0.043	-0.044	0.032	0.009	0.003	0.023	-0.034	0.047	-0.022	-0.007	-0.019
	(0.029)	(0.022)	(0.022)	(0.029)	(0.026)	(0.027)	(0.034)	(0.021)	(0.021)	(0.018)	(0.033)	(0.021)	(0.025)	(0.030)
	p=.556	p=.574	p=.082	p=.144	p=.091	p=.244	p=.789	p=.908	p=.274	p=.062	p=.163	p=.316	p=.789	p=.533
CBI Only	0.001	0.019	-0.013	-0.008	0.050	-0.023	-0.036	0.098	0.026	-0.087	0.024	-0.018	0.025	-0.031
	(0.026)	(0.024)	(0.022)	(0.031)	(0.022)	(0.023)	(0.042)	(0.030)	(0.020)	(0.020)	(0.036)	(0.021)	(0.025)	(0.028)
	p=.958	p=.421	p=.566	p=.807	p=.026	p=.334	p=.386	p=.001	p=.201	p=.000	p=.502	p=.384	p=.315	p=.276
Marginal Effects Relative to Acam+Nalt+MM+CBI														
CBI Only	0.018	0.006	0.026	-0.051	0.094	-0.054	-0.046	0.095	0.003	-0.052	-0.023	0.003	0.032	-0.013
	(0.026)	(0.023)	(0.024)	(0.032)	(0.028)	(0.025)	(0.040)	(0.025)	(0.022)	(0.024)	(0.035)	(0.022)	(0.023)	(0.030)
	p=.484	p=.782	p=.282	p=.119	p=.001	p=.032	p=.263	p=.000	p=.899	p=.028	p=.513	p=.883	p=.168	p=.677

Appendix Table D.12. Marginal Effect of Each COMBINE Treatment Arm On Outcomes Following COMBINE Treatment- Estimated without controlling for unobserved heterogeneity

COMBINE Treatment Arm	Not Em-ployed	Em-ployed < 90% of Period	Em-ployed Part Time >90% of Period	Em-ployed Full Time >90% of Period	Condi-tional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Ab-stinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
Average Outcome														
MM Only	0.170	0.193	0.113	0.524	2.899	0.097	0.714	0.129	0.068	0.089	0.285	0.108	0.237	0.370
Acam + MM	0.166	0.172	0.151	0.511	2.891	0.168	0.636	0.154	0.084	0.127	0.345	0.114	0.195	0.345
Nalt + MM	0.196	0.184	0.123	0.496	2.818	0.149	0.549	0.260	0.074	0.117	0.314	0.080	0.266	0.340
Acam + Nalt+ MM	0.199	0.186	0.104	0.511	2.809	0.124	0.622	0.200	0.083	0.094	0.357	0.086	0.221	0.336
MM + CBI	0.154	0.191	0.128	0.526	2.751	0.135	0.663	0.192	0.078	0.067	0.321	0.100	0.208	0.371
Acam + MM + CBI	0.191	0.180	0.107	0.522	2.804	0.134	0.636	0.204	0.098	0.062	0.283	0.110	0.252	0.355
Nalt + MM+ CBI	0.168	0.169	0.140	0.523	2.819	0.171	0.665	0.119	0.085	0.132	0.268	0.115	0.215	0.402
Acam + Nalt + MM + CBI	0.139	0.176	0.104	0.580	2.899	0.182	0.680	0.140	0.108	0.073	0.301	0.107	0.215	0.376
CBI Only	0.173	0.191	0.125	0.511	2.939	0.140	0.607	0.225	0.112	0.057	0.304	0.091	0.242	0.363

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Appendix Table D.12 (Continued). Marginal Effect of Each COMBINE Treatment Arm On Outcomes Following COMBINE Treatment - Estimated without controlling for unobserved heterogeneity

COMBINE Treatment Arm	Not Em-ployed	Em-ployed < 90% of Period	Em-ployed Part Time >90% of Period	Em-ployed Full Time >90% of Period	Condi-tional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Ab- stinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
Marginal Effects Relative To: *MM Only*														
Acam + MM	-0.005	-0.021	0.038	-0.013	-0.008	0.071	-0.079	0.025	0.016	0.038	0.060	0.006	-0.042	-0.025
	(0.039)	(0.032)	(0.024)	(0.034)	(0.033)	(0.024)	(0.036)	(0.023)	(0.016)	(0.024)	(0.036)	(0.035)	(0.034)	(0.038)
	p=.901	p=.516	p=.115	p=.708	p=.805	p=.004	p=.030	p=.268	p=.345	p=.110	p=.096	p=.859	p=.221	p=.515
Nalt + MM	0.026	-0.009	0.011	-0.028	-0.082	0.052	-0.165	0.131	0.006	0.028	0.029	-0.028	0.029	-0.029
	(0.032)	(0.028)	(0.025)	(0.035)	(0.034)	(0.026)	(0.036)	(0.028)	(0.017)	(0.019)	(0.033)	(0.036)	(0.034)	(0.040)
	p=.420	p=.762	p=.672	p=.419	p=.019	p=.049	p=.000	p=.000	p=.728	p=.134	p=.380	p=.437	p=.394	p=.461
Acam + Nalt+ MM	0.028	-0.007	-0.008	-0.013	-0.090	0.027	-0.092	0.072	0.015	0.005	0.072	-0.022	-0.016	-0.034
	(0.026)	(0.031)	(0.022)	(0.036)	(0.034)	(0.024)	(0.035)	(0.028)	(0.016)	(0.023)	(0.039)	(0.038)	(0.036)	(0.040)
	p=.286	p=.837	p=.705	p=.712	p=.009	p=.258	p=.009	p=.011	p=.344	p=.830	p=.070	p=.567	p=.659	p=.392
MM + CBI	-0.016	-0.002	0.016	0.002	-0.148	0.038	-0.051	0.064	0.010	-0.022	0.035	-0.008	-0.029	0.001
	(0.028)	(0.030)	(0.027)	(0.031)	(0.031)	(0.022)	(0.034)	(0.028)	(0.014)	(0.022)	(0.037)	(0.036)	(0.034)	(0.038)
	p=.557	p=.958	p=.556	p=.949	p=.000	p=.081	p=.139	p=.024	p=.493	p=.306	p=.340	p=.828	p=.408	p=.976
Acam + MM + CBI	0.021	-0.013	-0.005	-0.003	-0.096	0.037	-0.078	0.075	0.030	-0.027	-0.002	0.002	0.015	-0.015
	(0.040)	(0.030)	(0.025)	(0.037)	(0.033)	(0.020)	(0.033)	(0.024)	(0.018)	(0.018)	(0.036)	(0.035)	(0.033)	(0.039)
	p=.609	p=.671	p=.832	p=.947	p=.005	p=.065	p=.020	p=.003	p=.101	p=.126	p=.949	p=.955	p=.650	p=.707
Nalt + MM+ CBI	-0.003	-0.024	0.028	-0.001	-0.081	0.074	-0.049	-0.010	0.017	0.043	-0.017	0.007	-0.022	0.032
	(0.022)	(0.024)	(0.022)	(0.033)	(0.033)	(0.022)	(0.032)	(0.020)	(0.017)	(0.022)	(0.035)	(0.039)	(0.035)	(0.043)
	p=.900	p=.323	p=.211	p=.971	p=.016	p=.001	p=.127	p=.605	p=.323	p=.056	p=.624	p=.861	p=.530	p=.453
Acam + Nalt + MM + CBI	-0.031	-0.017	-0.009	0.056	-0.001	0.085	-0.035	0.011	0.040	-0.016	0.016	-0.001	-0.022	0.006
	(0.022)	(0.027)	(0.020)	(0.032)	(0.030)	(0.025)	(0.033)	(0.023)	(0.016)	(0.019)	(0.038)	(0.036)	(0.033)	(0.039)
	p=.155	p=.536	p=.674	p=.078	p=.977	p=.001	p=.304	p=.631	p=.013	p=.399	p=.675	p=.985	p=.517	p=.871
CBI Only	0.003	-0.001	0.012	-0.014	0.039	0.043	-0.108	0.096	0.044	-0.032	0.018	-0.017	0.005	-0.006
	(0.034)	(0.028)	(0.025)	(0.037)	(0.036)	(0.022)	(0.033)	(0.026)	(0.016)	(0.021)	(0.037)	(0.037)	(0.035)	(0.041)
	p=.940	p=.964	p=.622	p=.716	p=.281	p=.055	p=.002	p=.000	p=.007	p=.135	p=.624	p=.646	p=.884	p=.876

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Appendix Table D.12 (Continued). Marginal Effect of Each COMBINE Treatment Arm On Outcomes Following COMBINE Treatment - Estimated without controlling for unobserved heterogeneity

COMBINE Treatment Arm	Not Em-ployed	Em-ployed < 90% of Period	Em-ployed Part Time >90% of Period	Em-ployed Full Time >90% of Period	Condi-tional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Ab-stinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
Marginal Effects Relative To: *Acam + MM*														
Nalt + MM	0.031	0.012	-0.028	-0.015	-0.074	-0.019	-0.086	0.106	-0.010	-0.010	-0.031	-0.035	0.071	-0.005
	(0.046)	(0.022)	(0.029)	(0.032)	(0.029)	(0.029)	(0.034)	(0.030)	(0.018)	(0.024)	(0.033)	(0.019)	(0.024)	(0.033)
	p=.503	p=.586	p=.344	p=.638	p=.014	p=.507	p=.011	p=.001	p=.591	p=.680	p=.345	p=.069	p=.004	p=.883
Acam + Nalt+ MM	0.033	0.014	-0.047	0.000	-0.082	-0.044	-0.013	0.046	0.000	-0.033	0.012	-0.028	0.026	-0.009
	(0.038)	(0.022)	(0.023)	(0.030)	(0.031)	(0.025)	(0.034)	(0.031)	(0.020)	(0.023)	(0.034)	(0.023)	(0.022)	(0.032)
	p=.392	p=.525	p=.046	p=.990	p=.009	p=.078	p=.699	p=.141	p=.993	p=.153	p=.728	p=.222	p=.249	p=.771
MM + CBI	-0.011	0.019	-0.023	0.015	-0.140	-0.033	0.028	0.039	-0.006	-0.060	-0.025	-0.014	0.013	0.026
	(0.040)	(0.023)	(0.027)	(0.029)	(0.034)	(0.025)	(0.036)	(0.031)	(0.019)	(0.024)	(0.037)	(0.022)	(0.025)	(0.032)
	p=.773	p=.406	p=.401	p=.608	p=.000	p=.185	p=.451	p=.220	p=.760	p=.013	p=.508	p=.517	p=.602	p=.429
Acam + MM + CBI	0.025	0.008	-0.044	0.010	-0.088	-0.035	0.000	0.050	0.015	-0.065	-0.062	-0.004	0.057	0.010
	(0.063)	(0.026)	(0.030)	(0.036)	(0.032)	(0.024)	(0.033)	(0.026)	(0.021)	(0.019)	(0.033)	(0.020)	(0.024)	(0.032)
	p=.688	p=.759	p=.152	p=.774	p=.007	p=.157	p=.995	p=.054	p=.493	p=.001	p=.062	p=.829	p=.018	p=.759
Nalt + MM+ CBI	0.002	-0.003	-0.011	0.012	-0.072	0.003	0.030	-0.035	0.001	0.005	-0.077	0.001	0.020	0.057
	(0.038)	(0.021)	(0.024)	(0.029)	(0.033)	(0.026)	(0.033)	(0.022)	(0.019)	(0.027)	(0.036)	(0.023)	(0.026)	(0.029)
	p=.958	p=.886	p=.658	p=.689	p=.033	p=.922	p=.370	p=.110	p=.957	p=.863	p=.033	p=.981	p=.439	p=.051
Acam + Nalt + MM + CBI	-0.026	0.004	-0.047	0.069	0.007	0.014	0.044	-0.014	0.024	-0.054	-0.044	-0.007	0.020	0.031
	(0.036)	(0.022)	(0.022)	(0.030)	(0.027)	(0.026)	(0.033)	(0.024)	(0.018)	(0.021)	(0.036)	(0.019)	(0.024)	(0.032)
	p=.472	p=.847	p=.035	p=.025	p=.789	p=.597	p=.182	p=.545	p=.191	p=.010	p=.223	p=.714	p=.412	p=.332
CBI Only	0.007	0.020	-0.026	-0.001	0.047	-0.028	-0.029	0.071	0.028	-0.070	-0.042	-0.023	0.047	0.018
	(0.044)	(0.023)	(0.029)	(0.029)	(0.032)	(0.026)	(0.036)	(0.028)	(0.020)	(0.020)	(0.034)	(0.020)	(0.023)	(0.031)
	p=.869	p=.406	p=.367	p=.979	p=.137	p=.279	p=.425	p=.013	p=.157	p=.001	p=.218	p=.258	p=.041	p=.563

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Appendix Table D.12 (Continued). Marginal Effect of Each COMBINE Treatment Arm On Outcomes Following COMBINE Treatment - Estimated without controlling for unobserved heterogeneity

COMBINE Treatment Arm	Not Em-ployed	Em-ployed < 90% of Period	Em-ployed Part Time >90% of Period	Em-ployed Full Time >90% of Period	Condi-tional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Ab-stinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
Marginal Effects Relative To: *Nalt + MM*														
Acam + Nalt+ MM	0.002	0.002	-0.019	0.015	-0.009	-0.025	0.073	-0.060	0.010	-0.023	0.043	0.006	-0.045	-0.005
	(0.037)	(0.024)	(0.024)	(0.028)	(0.037)	(0.029)	(0.033)	(0.033)	(0.021)	(0.020)	(0.034)	(0.020)	(0.026)	(0.033)
	p=.953	p=.931	p=.432	p=.600	p=.817	p=.388	p=.029	p=.078	p=.648	p=.256	p=.205	p=.749	p=.088	p=.891
MM + CBI	-0.042	0.007	0.005	0.030	-0.066	-0.014	0.114	-0.067	0.004	-0.051	0.007	0.021	-0.058	0.031
	(0.038)	(0.021)	(0.027)	(0.033)	(0.037)	(0.028)	(0.036)	(0.033)	(0.017)	(0.019)	(0.040)	(0.023)	(0.028)	(0.033)
	p=.267	p=.739	p=.851	p=.361	p=.073	p=.615	p=.002	p=.046	p=.824	p=.009	p=.868	p=.382	p=.042	p=.363
Acam + MM + CBI	-0.005	-0.004	-0.016	0.026	-0.014	-0.016	0.087	-0.056	0.024	-0.055	-0.031	0.030	-0.014	0.015
	(0.052)	(0.025)	(0.027)	(0.033)	(0.036)	(0.026)	(0.035)	(0.031)	(0.020)	(0.017)	(0.032)	(0.018)	(0.025)	(0.033)
	p=.919	p=.862	p=.549	p=.445	p=.695	p=.557	p=.015	p=.072	p=.226	p=.001	p=.328	p=.096	p=.587	p=.660
Nalt + MM+ CBI	-0.029	-0.015	0.017	0.027	0.001	0.022	0.116	-0.141	0.011	0.015	-0.046	0.035	-0.051	0.062
	(0.032)	(0.021)	(0.028)	(0.028)	(0.035)	(0.028)	(0.036)	(0.027)	(0.018)	(0.023)	(0.034)	(0.019)	(0.026)	(0.034)
	p=.369	p=.474	p=.537	p=.338	p=.975	p=.445	p=.002	p=.000	p=.557	p=.529	p=.184	p=.068	p=.054	p=.074
Acam + Nalt + MM + CBI	-0.057	-0.008	-0.019	0.084	0.081	0.033	0.131	-0.120	0.034	-0.044	-0.013	0.028	-0.051	0.036
	(0.032)	(0.022)	(0.025)	(0.026)	(0.033)	(0.029)	(0.032)	(0.029)	(0.019)	(0.019)	(0.036)	(0.020)	(0.028)	(0.032)
	p=.077	p=.719	p=.436	p=.002	p=.015	p=.255	p=.000	p=.000	p=.084	p=.020	p=.715	p=.173	p=.073	p=.258
CBI Only	-0.023	0.007	0.002	0.015	0.121	-0.009	0.057	-0.035	0.038	-0.060	-0.011	0.012	-0.024	0.023
	(0.044)	(0.022)	(0.029)	(0.032)	(0.037)	(0.024)	(0.040)	(0.034)	(0.017)	(0.020)	(0.035)	(0.019)	(0.025)	(0.034)
	p=.592	p=.737	p=.956	p=.655	p=.002	p=.720	p=.153	p=.311	p=.031	p=.003	p=.765	p=.543	p=.337	p=.493

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Appendix Table D.12 (Cont'd). Marginal Effect of COMBINE Treatment Arm On Outcomes Following COMBINE Treatment - Estimated w/o controlling for unobserved heterogeneity

COMBINE Treatment Arm	Not Em-ployed	Em-ployed < 90% of Period	Employed Part Time >90% of Period	Employed Full Time >90% of Period	Condi-tional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Ab-stinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
Marginal Effects Relative To: *Acam + Nalt+ MM*														
MM + CBI	-0.044	0.005	0.024	0.015	-0.058	0.011	0.041	-0.008	-0.006	-0.027	-0.036	0.014	-0.013	0.035
	(0.034)	(0.024)	(0.024)	(0.030)	(0.036)	(0.021)	(0.037)	(0.033)	(0.017)	(0.022)	(0.043)	(0.024)	(0.028)	(0.030)
	p=.195	p=.836	p=.309	p=.615	p=.115	p=.604	p=.269	p=.814	p=.746	p=.217	p=.396	p=.565	p=.647	p=.244
Acam + MM + CBI	-0.008	-0.007	0.003	0.011	-0.006	0.010	0.013	0.004	0.015	-0.032	-0.074	0.024	0.031	0.019
	(0.042)	(0.024)	(0.024)	(0.031)	(0.032)	(0.022)	(0.031)	(0.032)	(0.022)	(0.019)	(0.035)	(0.022)	(0.026)	(0.033)
	p=.860	p=.789	p=.891	p=.726	p=.862	p=.655	p=.670	p=.906	p=.499	p=.102	p=.037	p=.266	p=.236	p=.560
Nalt + MM+ CBI	-0.031	-0.017	0.036	0.012	0.010	0.047	0.043	-0.082	0.001	0.038	-0.089	0.029	-0.006	0.066
	(0.026)	(0.022)	(0.023)	(0.025)	(0.033)	(0.024)	(0.033)	(0.027)	(0.019)	(0.024)	(0.036)	(0.025)	(0.027)	(0.030)
	p=.236	p=.431	p=.115	p=.629	p=.771	p=.057	p=.191	p=.003	p=.950	p=.124	p=.016	p=.257	p=.825	p=.031
Acam + Nalt + MM + CBI	-0.059	-0.010	0.000	0.069	0.089	0.058	0.057	-0.061	0.024	-0.021	-0.056	0.021	-0.006	0.040
	(0.022)	(0.022)	(0.019)	(0.026)	(0.029)	(0.024)	(0.030)	(0.028)	(0.020)	(0.019)	(0.040)	(0.022)	(0.026)	(0.033)
	p=.009	p=.652	p=.995	p=.009	p=.003	p=.016	p=.056	p=.030	p=.215	p=.256	p=.160	p=.328	p=.821	p=.217
CBI Only	-0.026	0.005	0.021	0.000	0.129	0.016	-0.016	0.025	0.028	-0.037	-0.053	0.005	0.021	0.028
	(0.035)	(0.023)	(0.027)	(0.028)	(0.033)	(0.024)	(0.033)	(0.030)	(0.022)	(0.020)	(0.037)	(0.022)	(0.024)	(0.033)
	p=.459	p=.817	p=.448	p=.989	p=.000	p=.499	p=.633	p=.418	p=.198	p=.066	p=.149	p=.819	p=.386	p=.403
Marginal Effects Relative to MM+ CBI														
Acam + MM + CBI	0.037	-0.011	-0.021	-0.005	0.052	-0.001	-0.027	0.012	0.021	-0.005	-0.038	0.010	0.044	-0.016
	(0.042)	(0.026)	(0.024)	(0.033)	(0.036)	(0.021)	(0.033)	(0.030)	(0.020)	(0.016)	(0.038)	(0.022)	(0.025)	(0.030)
	p=.381	p=.663	p=.381	p=.893	p=.147	p=.950	p=.406	p=.700	p=.297	p=.774	p=.317	p=.658	p=.081	p=.601
Nalt + MM+ CBI	0.013	-0.022	0.012	-0.003	0.068	0.036	0.002	-0.074	0.007	0.065	-0.053	0.015	0.007	0.031
	(0.036)	(0.022)	(0.027)	(0.027)	(0.033)	(0.024)	(0.034)	(0.028)	(0.016)	(0.024)	(0.039)	(0.026)	(0.027)	(0.031)
	p=.708	p=.305	p=.657	p=.907	p=.046	p=.133	p=.953	p=.010	p=.678	p=.009	p=.181	p=.576	p=.800	p=.320
Acam+Nalt + MM +CBI	-0.015	-0.015	-0.024	0.054	0.147	0.047	0.017	-0.053	0.030	0.006	-0.020	0.007	0.007	0.005
	(0.030)	(0.025)	(0.022)	(0.028)	(0.033)	(0.025)	(0.034)	(0.025)	(0.019)	(0.018)	(0.041)	(0.024)	(0.030)	(0.031)
	p=.621	p=.545	p=.274	p=.059	p=.000	p=.061	p=.627	p=.034	p=.121	p=.734	p=.631	p=.762	p=.809	p=.868
CBI Only	0.019	0.000	-0.004	-0.016	0.187	0.006	-0.057	0.032	0.034	-0.010	-0.017	-0.009	0.034	-0.008
	(0.048)	(0.024)	(0.033)	(0.030)	(0.032)	(0.022)	(0.035)	(0.030)	(0.019)	(0.019)	(0.034)	(0.023)	(0.027)	(0.032)
	p=.693	p=.990	p=.917	p=.607	p=.000	p=.808	p=.114	p=.287	p=.078	p=.602	p=.617	p=.697	p=.208	p=.816

Appendix Table D.12 (Continued). Marginal Effect of Each COMBINE Treatment Arm On Outcomes Following COMBINE Treatment - Estimated without controlling for unobserved heterogeneity

COMBINE Treatment Arm	Not Em- ployed	Em- ployed < 90% of Period	Em- ployed Part Time >90% of Period	Em- ployed Full Time >90% of Period	Condi- tional Log Wage	Anti-De- pressant Use	No Treat- ment	Self Help Visits	Out- patient Therapy (No RxT)	RxT	Ab- stinent	Non- Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
Marginal Effects Relative To: *Acam + MM+CBI*														
Nalt + MM+ CBI	-0.024	-0.011	0.033	0.001	0.015	0.037	0.029	-0.085	-0.014	0.070	-0.015	0.005	-0.037	0.047
	(0.046)	(0.024)	(0.027)	(0.029)	(0.033)	(0.024)	(0.030)	(0.023)	(0.022)	(0.019)	(0.032)	(0.022)	(0.026)	(0.033)
	p=.608	p=.652	p=.221	p=.965	p=.648	p=.123	p=.329	p=.000	p=.541	p=.001	p=.644	p=.831	p=.156	p=.164
Acam + Nalt + MM + CBI	-0.052	-0.004	-0.003	0.059	0.095	0.048	0.044	-0.064	0.010	0.011	0.018	-0.003	-0.037	0.021
	(0.040)	(0.023)	(0.021)	(0.031)	(0.031)	(0.025)	(0.031)	(0.023)	(0.020)	(0.014)	(0.035)	(0.019)	(0.028)	(0.029)
	p=.204	p=.875	p=.872	p=.061	p=.003	p=.057	p=.155	p=.006	p=.639	p=.441	p=.607	p=.887	p=.189	p=.464
CBI Only	-0.018	0.012	0.018	-0.011	0.135	0.007	-0.029	0.021	0.013	-0.005	0.021	-0.019	-0.010	0.008
	(0.056)	(0.024)	(0.032)	(0.033)	(0.033)	(0.021)	(0.029)	(0.026)	(0.021)	(0.016)	(0.036)	(0.020)	(0.025)	(0.034)
	p=.748	p=.628	p=.578	p=.735	p=.000	p=.753	p=.310	p=.424	p=.522	p=.750	p=.569	p=.349	p=.686	p=.806
Marginal Effects Relative To: Nalt+MM+CBI														
Acam + Nalt + MM + CBI	-0.028	0.007	-0.036	0.057	0.080	0.011	0.015	0.021	0.023	-0.059	0.033	-0.008	0.000	-0.026
	(0.022)	(0.020)	(0.023)	(0.027)	(0.031)	(0.023)	(0.033)	(0.023)	(0.018)	(0.021)	(0.037)	(0.024)	(0.027)	(0.032)
	p=.202	p=.719	p=.112	p=.034	p=.010	p=.624	p=.659	p=.355	p=.202	p=.006	p=.381	p=.754	p=.994	p=.416
CBI Only	0.005	0.023	-0.016	-0.012	0.120	-0.030	-0.059	0.106	0.027	-0.075	0.035	-0.024	0.027	-0.039
	(0.027)	(0.022)	(0.026)	(0.028)	(0.032)	(0.023)	(0.035)	(0.024)	(0.019)	(0.022)	(0.035)	(0.024)	(0.025)	(0.030)
	p=.844	p=.300	p=.549	p=.658	p=.000	p=.197	p=.101	p=.000	p=.153	p=.001	p=.306	p=.334	p=.286	p=.205
Marginal Effects Relative to Acam+Nalt+MM+CBI														
CBI Only	0.034	0.015	0.021	-0.070	0.040	-0.042	-0.073	0.085	0.004	-0.016	0.003	-0.016	0.027	-0.013
	(0.032)	(0.022)	(0.025)	(0.030)	(0.030)	(0.025)	(0.036)	(0.027)	(0.020)	(0.017)	(0.036)	(0.020)	(0.026)	(0.033)
	p=.291	p=.497	p=.400	p=.022	p=.181	p=.105	p=.043	p=.002	p=.841	p=.346	p=.944	p=.406	p=.305	p=.699

Appendix Table D.13. Marginal Effect of Lagged Treatment Choice Following COMBINE Treatment

Lagged Treatment Choice	Not Em-ployed	Em-ployed < 90% of Period	Em-ployed Part Time >90% of Period	Em-ployed Full Time >90% of Period	Condi-tional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Ab-stinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
Average Outcome														
No Treatment	0.160	0.177	0.121	0.542	2.842	0.190	0.671	0.082	0.048	0.198	0.285	0.094	0.212	0.410
Self Help Visits	0.161	0.185	0.135	0.518	2.845	0.181	0.705	0.123	0.125	0.048	0.274	0.107	0.216	0.402
Outpatient Therapy (No RxT)	0.159	0.176	0.125	0.540	2.814	0.158	0.679	0.225	0.064	0.032	0.281	0.096	0.230	0.393
RxT	0.156	0.177	0.124	0.543	2.832	0.158	0.837	0.080	0.050	0.034	0.233	0.105	0.219	0.443
Marginal Effects Relative to No Treatment														
Self Help Visits	0.001	0.008	0.014	-0.023	0.004	-0.010	0.034	0.040	0.077	-0.151	-0.010	0.013	0.004	-0.007
	(0.011)	(0.010)	(0.009)	(0.012)	(0.010)	(0.010)	(0.018)	(0.009)	(0.012)	(0.012)	(0.017)	(0.011)	(0.012)	(0.011)
	p=.915	p=.417	p=.133	p=.062	p=.737	p=.334	p=.060	p=.000	p=.000	p=.000	p=.547	p=.231	p=.724	p=.500
Outpatient Therapy (No RxT)	-0.001	-0.001	0.004	-0.002	-0.028	-0.032	0.008	0.143	0.016	-0.166	-0.003	0.002	0.018	-0.017
	(0.008)	(0.009)	(0.007)	(0.010)	(0.008)	(0.008)	(0.015)	(0.012)	(0.005)	(0.012)	(0.012)	(0.008)	(0.009)	(0.009)
	p=.935	p=.873	p=.550	p=.848	p=.000	p=.000	p=.604	p=.000	p=.004	p=.000	p=.796	p=.845	p=.050	p=.080
RxT	-0.004	-0.001	0.003	0.002	-0.010	-0.032	0.166	-0.003	0.001	-0.165	-0.052	0.011	0.008	0.033
	(0.007)	(0.008)	(0.006)	(0.009)	(0.008)	(0.007)	(0.011)	(0.005)	(0.004)	(0.012)	(0.011)	(0.007)	(0.008)	(0.009)
	p=.619	p=.931	p=.639	p=.862	p=.220	p=.000	p=.000	p=.569	p=.708	p=.000	p=.000	p=.100	p=.325	p=.000

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Appendix Table D.13 (Continued). Marginal Effect of Lagged Treatment Choice Following COMBINE Treatment

Lagged Treatment Choice	Not Em-ployed	Em-ployed < 90% of Period	Em- ployed Part Time >90% of Period	Em-ployed Full Time >90% of Period	Condi-tional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Abstinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
Marginal Effects Relative to SH Visits														
Outpatient Therapy (No RxT)	-0.002	-0.010	-0.010	0.022	-0.032	-0.023	-0.026	0.102	-0.061	-0.015	0.007	-0.012	0.014	-0.009
	(0.009)	(0.009)	(0.010)	(0.011)	(0.010)	(0.009)	(0.013)	(0.012)	(0.012)	(0.006)	(0.014)	(0.010)	(0.011)	(0.010)
	p=.842	p=.296	p=.291	p=.053	p=.001	p=.009	p=.042	p=.000	p=.000	p=.007	p=.612	p=.261	p=.194	p=.336
RxT	-0.005	-0.009	-0.011	0.025	-0.013	-0.022	0.132	-0.043	-0.075	-0.014	-0.042	-0.002	0.003	0.040
	(0.008)	(0.008)	(0.008)	(0.009)	(0.009)	(0.008)	(0.013)	(0.009)	(0.011)	(0.005)	(0.014)	(0.010)	(0.010)	(0.011)
	p=.551	p=.282	p=.150	p=.009	p=.135	p=.007	p=.000	p=.000	p=.000	p=.011	p=.003	p=.839	p=.742	p=.000
Marginal Effects Relative to Outpatient Therapy (No RxT)														
RxT	-0.003	0.001	-0.001	0.004	0.019	0.001	0.158	-0.145	-0.014	0.001	-0.049	0.010	-0.011	0.050
	(0.004)	(0.005)	(0.005)	(0.007)	(0.005)	(0.005)	(0.010)	(0.010)	(0.005)	(0.003)	(0.010)	(0.006)	(0.005)	(0.009)
	p=.461	p=.885	p=.818	p=.600	p=.001	p=.915	p=.000	p=.000	p=.004	p=.659	p=.000	p=.099	p=.050	p=.000

Appendix Table D.14. Policy Experiment: Marginal Effects of 5% and 10% Higher Gas Prices on Outcomes

Gas Prices During All Periods		Not Em-ployed	Em-ployed <90% of Period	Em-ployed Part Time >90% of Period	Em-ployed Full Time >90% of Period	Condi-tional Log Wage	Anti-De-pressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Ab-stinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
Marginal Effects															
	Relative to:														
5% higher gas prices	Original Gas Prices	-0.001	-0.002	0.002	0.001	0.003	0.001	-0.005	0.001	0.002	0.002	0.016	0.000	-0.007	-0.009
		(0.003)	(0.003)	(0.003)	(0.004)	(0.001)	(0.005)	(0.006)	(0.004)	(0.003)	(0.004)	(0.006)	(0.003)	(0.003)	(0.005)
		p=.729	p=.567	p=.495	p=.889	p=.067	p=.782	p=.418	p=.725	p=.558	p=.660	p=.008	p=.966	p=.053	p=.038
10% higher gas prices		-0.002	-0.003	0.004	0.002	0.009	0.002	-0.010	0.004	0.003	0.003	0.035	0.000	-0.014	-0.022
		(0.006)	(0.006)	(0.006)	(0.008)	(0.004)	(0.010)	(0.011)	(0.008)	(0.005)	(0.007)	(0.012)	(0.006)	(0.007)	(0.011)
		p=.706	p=.578	p=.567	p=.819	p=.071	p=.825	p=.374	p=.638	p=.573	p=.664	p=.005	p=.990	p=.033	p=.031
Marginal Effects															
10% higher gas prices	5% gas prices	-0.001	-0.002	0.002	0.001	0.004	0.001	-0.006	0.002	0.002	0.002	0.018	0.000	-0.008	-0.010
		(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.005)	(0.006)	(0.004)	(0.003)	(0.004)	(0.006)	(0.003)	(0.003)	(0.005)
		p=.681	p=.590	p=.641	p=.745	p=.078	p=.864	p=.333	p=.558	p=.588	p=.667	p=.003	p=.941	p=.026	p=.026

Appendix Table D.15. Policy Experiment: Marginal Effects of Extended Pharmacotherapy Use on Outcomes

		Not Em-ployed	Employed <90% of Period	Employed Part Time >90% of Period	Employed Full Time >90% of Period	Conditional Log Wage	Anti-Depressant Use	No Treat-ment	Self Help Visits	Out-patient Therapy (No RxT)	RxT	Ab-stinent	Non-Problem Drinking Only	Problem Drinking <50% of Period	Problem Drinking >50% of Period
Experimental Two Periods of Pharmaco-therapy Use	Relative to: One period of Pharmaco-therapy Use	0.003	0.000	-0.004	0.001	0.014	0.035	-0.125	-0.033	-0.010	0.168	0.046	-0.011	-0.009	-0.026
		(0.008)	(0.008)	(0.006)	(0.010)	(0.008)	(0.008)	(0.014)	(0.007)	(0.005)	(0.013)	(0.012)	(0.007)	(0.008)	(0.009)
		p=.683	p=.984	p=.528	p=.910	p=.087	p=.000	p=.000	p=.000	p=.034	p=.000	p=.000	p=.117	p=.252	p=.005

Figure 1. Model Fit Over Time: Employment

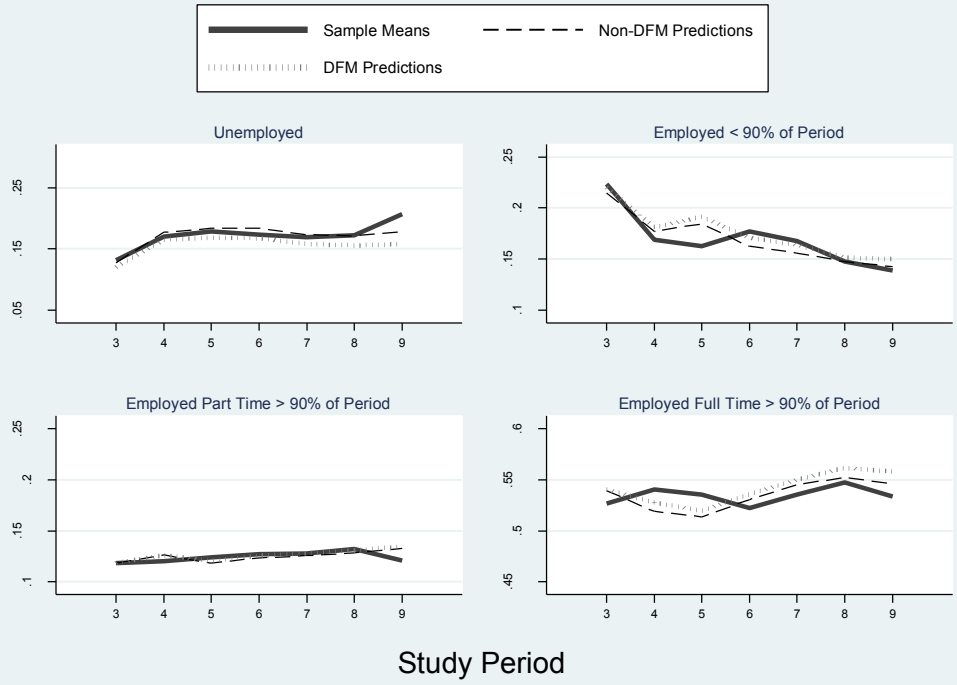


Figure 2. Model Fit Over Time: Alcohol Consumption

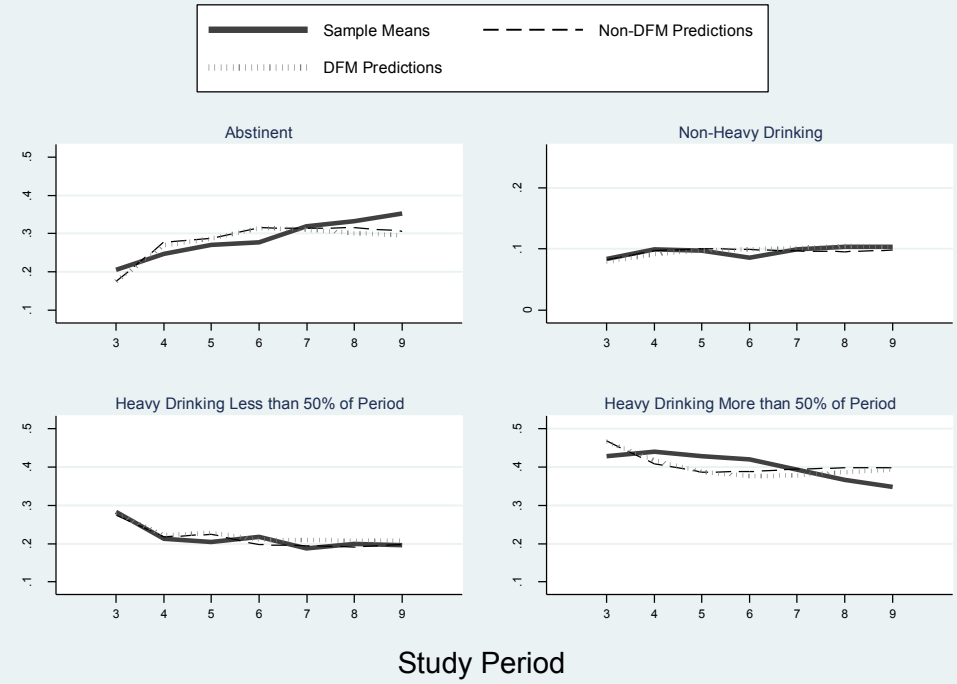


Figure 3. Model Fit Over Time: Alcohol Treatment Consumption

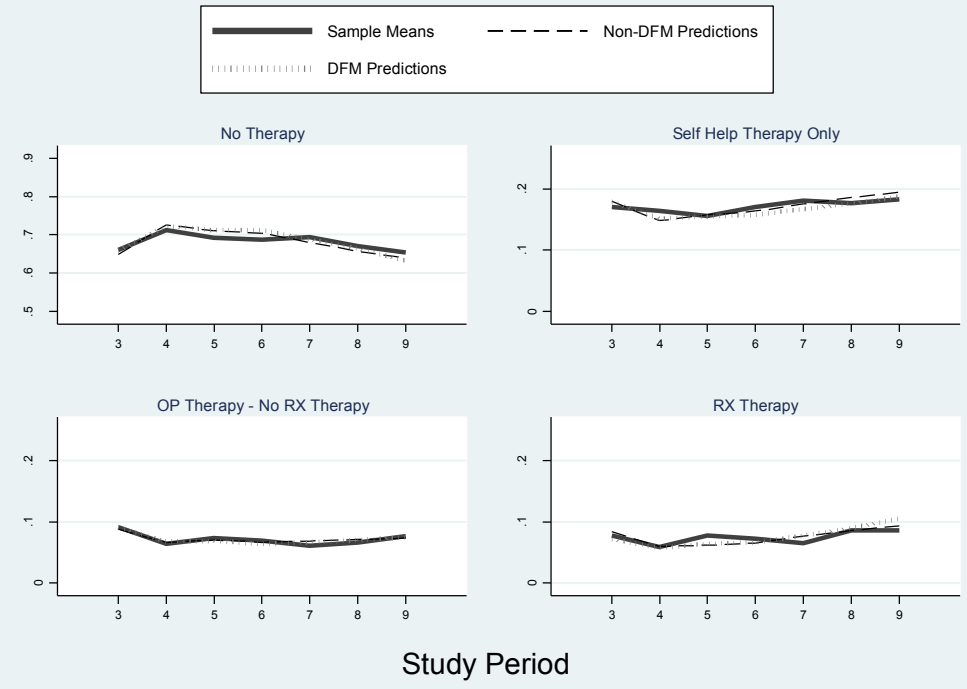


Figure 4. Alcohol Outcomes Over Time by Alcohol Use During COMBINE Treatment

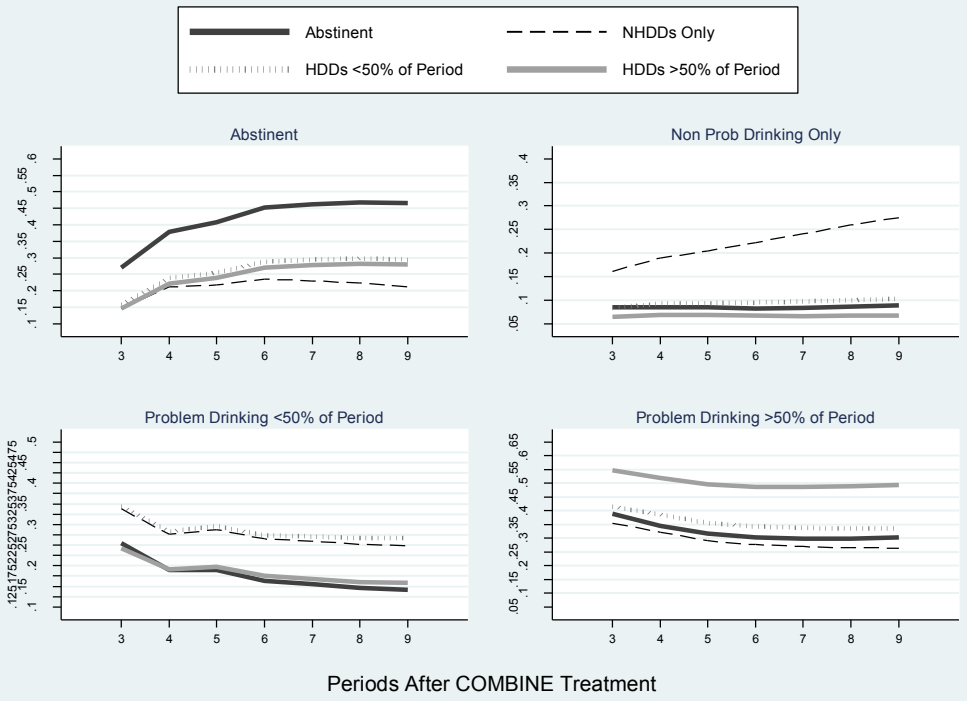


Figure 5. Employment Outcomes Over Time by Alcohol Use During COMBINE Treatment

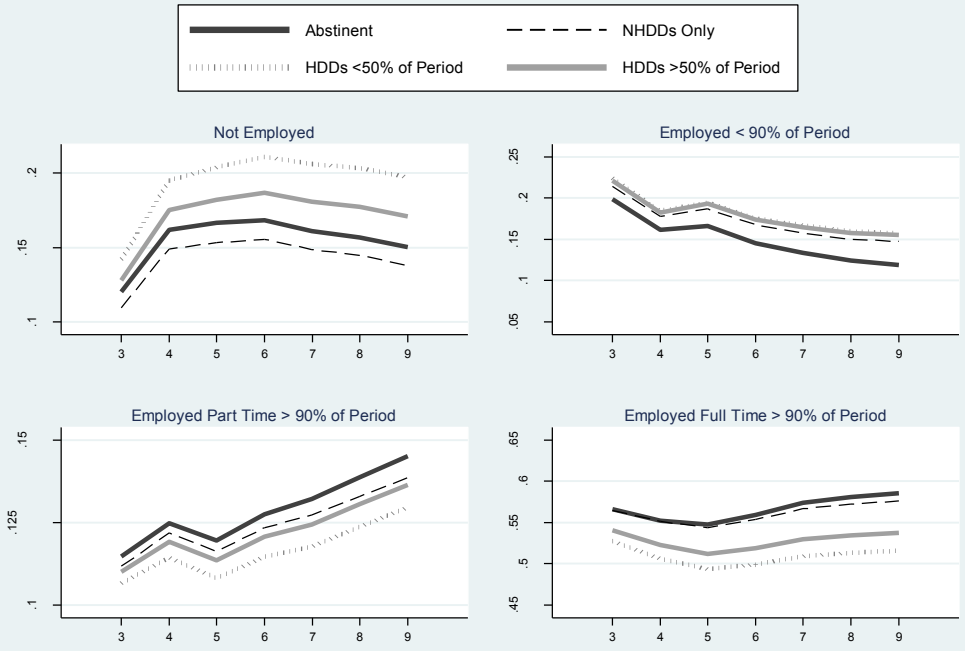


Figure 6. Alcohol Outcomes Over Time by COMBINE Treatment

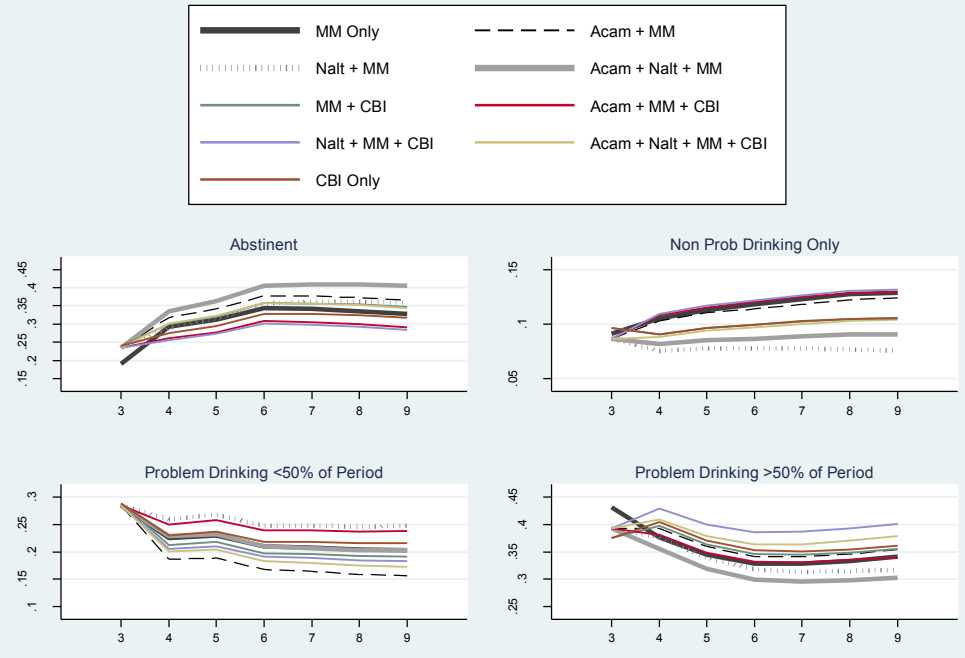


Figure 7. Alcohol Outcomes Over Time by by Lagged Employment

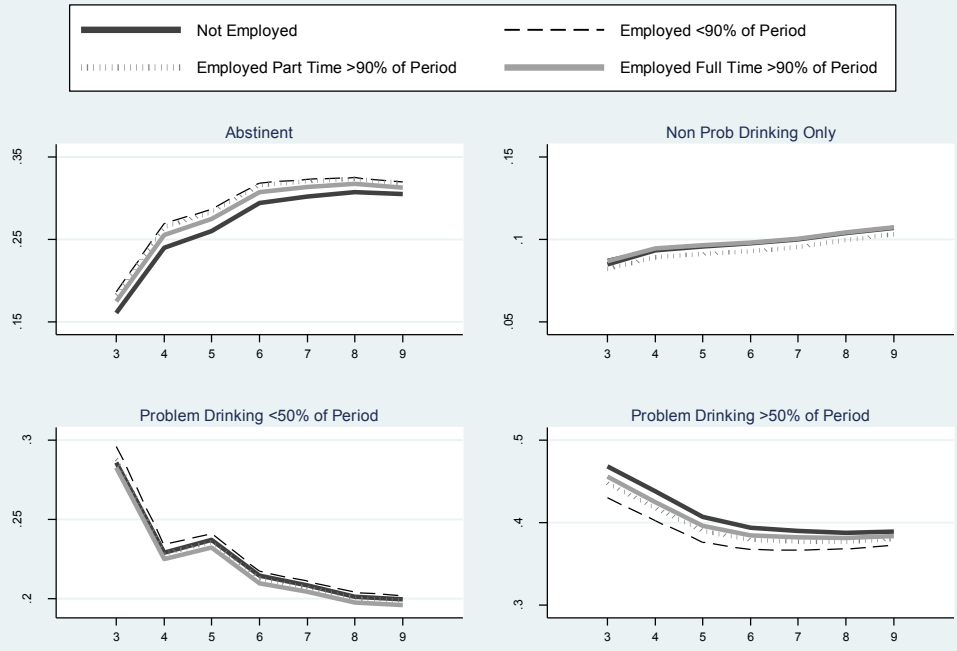


Figure 8. Employment Outcomes Over Time by Lagged Employment

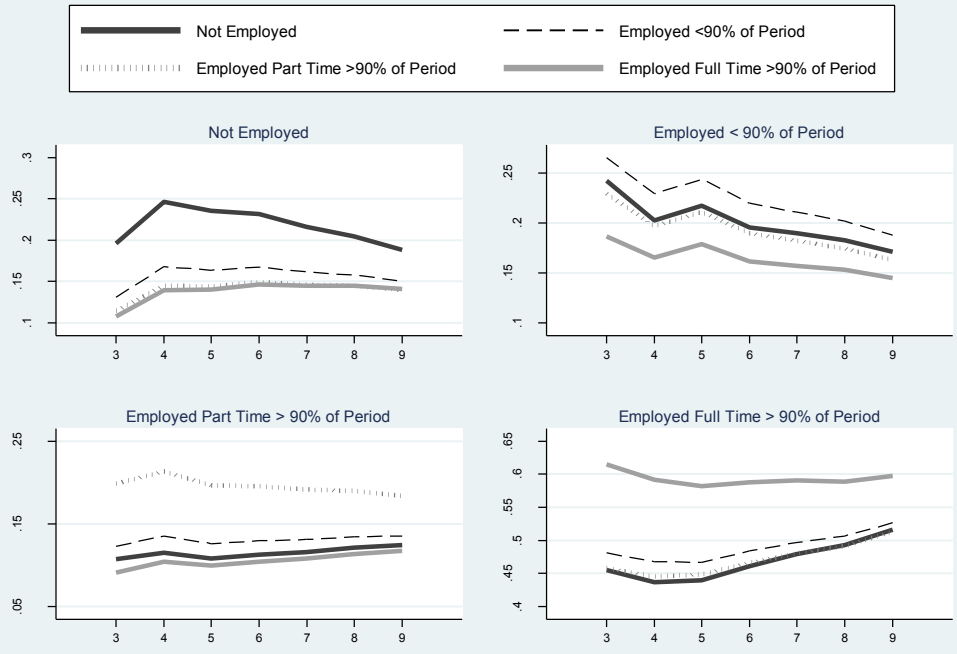
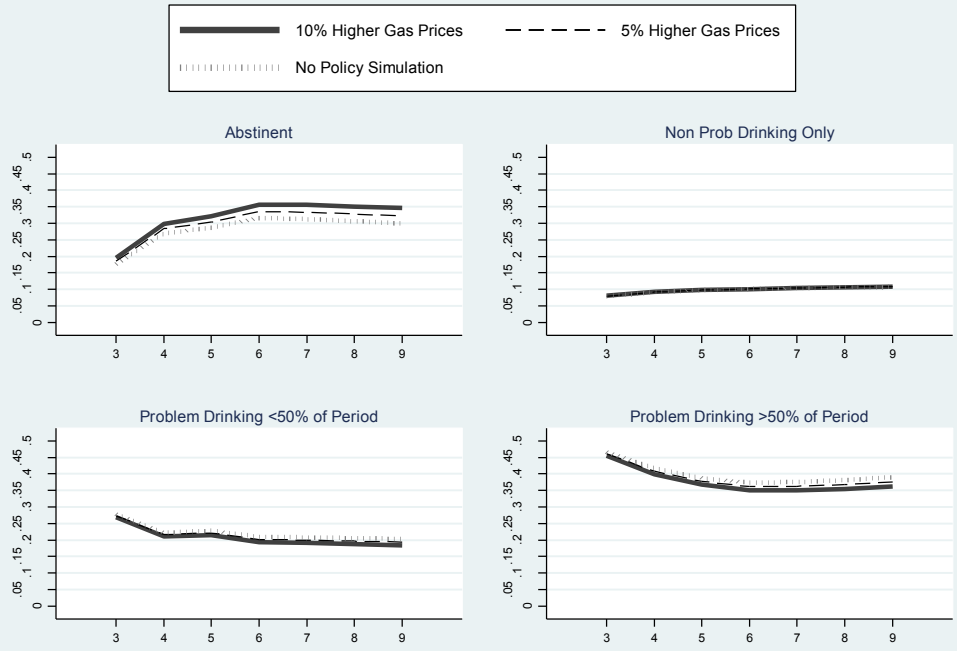


Figure 9. Alcohol Outcomes Over Time by Gas Price Variation



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