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Evaluating the Impact of California's Full Service Partnership Program Using a
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ABSTRACT

This study evaluates the impact of California's Full-Service Partnership (FSP) program using a multidimensional measure of outcomes. The FSP program is a key part of California's 2005 Mental Health Services Act. Secondary data were collected from the Consumer Perception Survey, the Client and Service Information System, and the Data Collection and Reporting System, all data systems which are maintained by the California Department of Mental Health. The analytic sample contained 39,681 observations of which 588 were FSP participants (seven repeated cross-sections from May 2005 to May 2008). We performed instrumental variables (IV) limited information maximum likelihood and IV Tobit analyses. The marginal monthly improvement in outcomes of services for FSP participants was approximately 3.5% higher than those receiving usual care with the outcomes of the average individual in the program improving by 33.4%. This shows that the FSP program is causally effective in improving outcomes among the seriously mentally ill.

Evaluating the Impact of California's Full Service Partnership Program Using a Multidimensional Measure of Outcomes

In 2004, California approved Proposition 63, a landmark in mental health policy, which became law in 2005 as the Mental Health Services Act (MHSA). The MHSA levied a 1% tax on adjusted gross incomes over \$1 million to augment funding of the county-operated public mental health systems in order to provide new recovery-oriented care for mental health consumers. By 2008-09, this resulted in an 18% increase over the 2003-04 budget (Felton, Cashin and Brown 2010).

A key MHSA program is the Full Service Partnership (FSP) program. The FSP program is modeled after California's experience with pilot programs that were targeted toward the homeless with serious mental illness (SMI). The FSP program is a modified version of assertive community treatment (ACT), as it provides individualized and integrated services, intensive case management, and 24-hour access to care, all of which are common features of ACT programs. Modifications include an explicit client-driven and recovery-oriented focus, and flexible funding for supports such as housing, child care and transportation (Felton, et al. 2010). See Table 1 for a list of services provided to FSP participants and those receiving usual care in the public mental health system.

[Table 1 placed approximately here]

Entry into the program is voluntary. The FSP program requires that clients be unserved or underserved and have at least one of the following characteristics depending on age and

unserved/underserved status: homeless, at risk for homelessness, involved in the criminal justice system, at risk of involvement with the criminal justice system, frequent user of emergency mental health services, at risk of frequent use of emergency mental health services, reduction in personal and/or community functioning, at risk for out-of-home placement, or at risk for institutionalization (California Code of Regulations 2010).

This study seeks to refine and extend earlier work evaluating the performance of the FSP program (Brown et al., 2010). In particular, this paper focuses on the overall multidimensional measure of programmatic effectiveness: perceptions of outcomes of services. We refine earlier work by using a more rigorous set of inclusion criteria and using a more rigorously defined and justified set of instrumental variables. We extend earlier work by adding a continuous measure of participation (months) and compare the results using this approach to the results found using the measure of any participation vs. non-participation which was used in earlier work. In addition, we extend earlier work by examining the extent to which the multidimensional measure of programmatic outcomes improves when housing outcomes are excluded from this measure (housing is a major component of the FSP program and to some it may appear redundant to also include housing as an outcome). Our three hypotheses are that (1) FSP participants will experience better outcomes than those participating in usual care, (2) the difference in outcomes between those participating in the FSP program and those participating in usual care will be larger the longer clients participate in the FSP program, and (3) the long-term differences in outcomes between those participating in the FSP program and those participating in usual care are not primarily due to differences in housing outcomes. We use an instrumental variables (IV) strategy to estimate the causal effects of participation in the FSP program.

This study was approved by both the Committees for the Protection of Human Subjects (CPHS) of the California Health and Human Services Agency and the University of California.

METHODS

Data

We use data from the Mental Health Statistics Improvement Program (MHSIP) portion of California's Consumer Perception Survey (CPS) for adults and older adults from 43 counties in California (California Department of Mental Health 2009). The MHSIP has been used in studies of Medicaid clients and to measure mental health outcomes by various State Departments of Mental Health (Mental Health Statistics Improvement Program 2011; Bianconi, Mahler and McFarland 2006; Leff et al. 2005). The MHSIP has been found to be valid and reliable (Eisen et al. 2001). California's version of the MHSIP contains a multidimensional measure of outcomes: perception of outcomes of services. See Table 2 for the details of this multidimensional measure.

[Table 2 placed approximately here]

During the period of time analyzed, the CPS was fielded approximately 14 days twice per year (May and November) and included virtually all individuals who accessed public mental health services during this period (California Department of Mental Health 2008). It thus represents repeated cross-sections. This data collection procedure produced an approximate random sample of non-institutionalized public mental health clients.

Information on psychiatric diagnoses comes from the Client and Service Information System (CSI). In consultation with a research psychiatrist, we grouped psychiatric diagnoses into

nine categories: schizophrenia, bipolar disorder, depression, anxiety and related disorders, personality disorder, substance abuse, alcohol abuse, unable to diagnose, and other disorders. Each diagnosis is assumed to apply to a consumer perpetually (a change in diagnosis was considered an additional diagnosis) which enables us to retain all relevant psychiatric information. Finally, we collapsed principal and secondary diagnoses into one group to limit the number of covariates in the model.

Additional information on age, sex, race/ethnicity, and total time receiving services in the public mental health system come from the Quality of Life portion of the CPS (California Department of Mental Health 2009). Finally, data on FSP participation come from the Data Collection and Reporting System (DCR). All data are maintained by the California Department of Mental Health (California Department of Mental Health 2011).

This study uses 7 waves of data: May 2005 to May 2008. Data were available for 43 of California's 58 counties. These 43 counties represent 85.4% of the California population.

Inclusion criteria are as follows. First, all clients must have received services for at least one year in the public health system, although not all of this time must have been spent in either the FSP program or outside of the FSP program. This criterion is included in order to largely remove differences between the treatment and comparison group with regard to familiarity with their local mental health department and the services available. Second, all clients must have completed a survey in either English or Spanish (97.5% of clients in the data fall into this category). This criterion is included in order to improve the likelihood that all clients analyzed have received linguistically and culturally appropriate care. While linguistically and culturally appropriate care is provided outside of these two groups across counties in California, this restriction avoids any variation in accessibility.

Econometric Analysis

The FSP program only serves a relatively small proportion of clients in the public mental health system due to limited funding. Thus, there are a significant number of clients who are not participants in the FSP program, but who have similar levels of need relative to those participating in the FSP program. Nevertheless, since individuals in the FSP program are selected because of their greater need for services, we use an instrumental variables strategy to correct for this selection bias and other potential sources of bias. The instrumental variable approach performs a function similar to random assignment: it seeks to remove the possibility that differences in outcomes between the treatment and comparison groups are due to differences between the groups themselves that are not due to differences in treatment. The results below report instrumental variables Tobit and ordinary Tobit results. For a full description of the technical details of the econometric analysis including additional analysis using two-stage limited information maximum likelihood models, please see the Technical Appendix.

RESULTS

Descriptive statistics are shown in Table 3. The final results are shown in Tables 4 and 5. The marginal effects can be interpreted as percentages when multiplied by 100. As shown in Table 4 under “IV Tobit Second Stage”, each additional month of participation in the FSP program results in an approximate 3.5% improvement in outcomes. Table 5 presents the overall effects of any participation in the FSP program and finds an overall 33.4% improvement in outcomes, where the average length of participation is 15.7 months. Note that the Tobit estimates that do not incorporate the instrumental variables are downward biased, being both close to zero

and statistically insignificant, underscoring the importance of using instrumental variables to correct for selection bias and other potential sources of bias.

[Table 5 placed approximately here]

Gender does not predict outcomes. Age is also not predictive of outcomes until age 55, at which time outcomes improve. African Americans have worse outcomes relative to Whites while Hispanics have superior outcomes relative to Whites. Schizophrenia is associated with better outcomes of services. In contrast, depression, anxiety disorder, personality disorder, and alcohol abuse are associated with worse outcomes.

As a robustness check, we removed the housing question from the outcomes scale to determine whether the emphasis of the FSP program on providing housing may account for a large proportion of the measured impact of participation in the FSP program. Using instrumental variables Tobit, this yielded approximately the same size effect as discussed above with respect to the monthly measure of participation, but moved statistical significance above standard accepted levels (marginal effect = 0.037, $p=0.07$). However, with respect to the overall measure of participation, it slightly reduced the marginal effect, while statistical significance remained well within standard accepted levels (marginal effect = 0.272, $p<0.01$).

DISCUSSION AND CONCLUSION

Our findings show that participation in the FSP program results in outcomes that are approximately 3.5% better per month of participation relative to outcomes for those participating in usual care. Outcomes are measured using a valid and reliable equally weighted index of eight

different outcomes including dealing with daily problems, being able to control one's life, dealing with crisis, family relationships, general social situations, school/work outcomes, housing situation, and psychiatric symptoms. Those who participated in the program for the average length of time in the sample, 15.7 months, had 33.4% better outcomes than those receiving usual care. The overall long-term effect thus may not be linear.

To determine if these results were primarily driven by improved housing, a strong emphasis of the FSP program, we removed the housing question from the index and reanalyzed the data. The monthly improvement results became statistically insignificant, but the marginal effect of overall participation remained strongly statistically significant, but with a slightly smaller marginal effect (27.5%). This suggests that the overall outcomes of the program go far beyond improved housing, although housing outcomes may dominate in the short-term.

This finding is consistent with the finding that FSP participants have fewer mental-health related emergency visits relative to those receiving usual care the longer they participate in the FSP program and that clients with sustained participation are most likely to transition to independent living (Brown et al. 2012; Yoon et al, forthcoming). However, it is likely that there are diminishing returns for participants who remain in the FSP program for extended periods of time. Previous pilot research on the Village, the innovative program that the FSP program is based on, suggests that significant improvements in recovery may continue for as long as two years (Miller et al., 2010). The current research does not address the impact on overall outcomes from leaving the FSP program.

Strengths of the current study include the use of multiple waves of survey data, the use of a validated multidimensional outcome measure, and the use of econometric techniques that allow for a causal interpretation of the results. Weaknesses of the current study include the lack of

individual-level panel data, which would allow for the use of individual fixed effects. This weakness is mitigated by the use of the instrumental variable method which corrects for omitted variable bias, measurement error, and the effects of reverse causation (Wooldridge 2002).

While these findings are encouraging, the size of the expenditure needed to produce these outcomes is an important consideration in the current fiscal environment. The FSP program has the appearance of being quite expensive. Average annual expenditures for the FSP program in California are approximately \$20,000 to \$24,000 per person (UCLA Center for Healthier Children, Youth and Families, 2012). This is significantly higher than expected from early funding requests (Felton et al., 2010). However, it turns out that between approximately three quarters and nine-tenths of this expenditure is offset by reductions in expenditures for other government-provided services. A study of the FSP program in San Diego County found that 82% of FSP program expenditures were offset by reductions in expenditures for justice system services and inpatient/emergency services (Gilmer et al. 2010). The most recent state-wide study that includes 47 of California's 58 counties mirrors the findings of Gilmer et al. (2010) finding that, depending on the fiscal year examined, from 75% to 88% of the expenditures for FSP enrollees were offset by reductions in expenditures for justice system services, physical health services, and alternative psychiatric services (UCLA Center for Healthier Children, Youth and Families, 2012). In other words, the true cost of providing the FSP program is drastically lower than the amount actually expended on the FSP program and implementation decisions should take this into account. While the degree to which these results are scalable is unclear, given the fact that the average FSP client has a much more severe condition than the average client outside of the FSP system, these are important findings and at minimum suggest that the program may

be reasonably scaled up to a level that includes virtually all clients whose conditions exhibit the same level of severity as currently enrolled clients.

TECHNICAL APPENDIX

Our econometric analysis incorporates a two step approach. We evaluate the validity of our instruments using two-stage limited information maximum likelihood (LIML) which provides finite-sample bias reduction (Angrist and Pischke 2009; Baum, Schaffer and Stillman 2007). We then scale the results down using an instrumental variables Tobit model.

Instrument Validity

To be valid, our instruments must meet the following four criteria (Angrist and Pischke 2009). First, the set of instruments must be strongly correlated with participation in the FSP program. We test for weak instruments using the approach described by Stock and Yogo (2005) for the LIML estimator. Second, the set of instruments must be conditionally independent of the outcomes. Third, the set of instruments must have no effect on the outcome other than through the first stage channel. In other words, the second and third criteria state that the set of instruments must be uncorrelated with the second stage error term, conditional on the included covariates. We provide support that our instruments satisfy the last two criteria by examining whether the instruments have any direct effect on outcomes by including them in the main equation and performing tests of statistical significance (Wooldridge, 2006). An additional test is Hansen's J test of overidentifying restrictions (Hayashi 2000). Overidentification tests assume that one instrument is valid in order to test the validity of the remaining instrument. We establish this validity below. The fourth criterion is that each instrument must be monotonic. This

condition can be satisfied by using a linear functional form in the first stage equation. In addition, since both of our instruments are dummy variables, this criterion is automatically satisfied.

Removing Bias from the Measured Causal Effect

While the above approach is appropriate for examining instrument validity, it does not take into account potential censoring of the dependent variable. Because the dependent variable is constrained by the structure of the Consumer Perception Survey (CPS) to vary from 1 to 5 and because some consumers may have desired to choose answers which correspond to a number higher than 5, we consider the dependent variable to be censored from the right (similar to top coding). Such censoring is indicated by the high percentage of responses that pile up at the top value of the scale (12.7%) which does not occur at the bottom value of the scale (0.29%). In such cases, using ordinary least squares or LIML may result in predictions outside of the [1, 5] interval and can also result in biased parameter estimates. To account for censoring we estimate an instrumental variables (IV) Tobit model where the upper limit is censored (Cameron and Trivedi 2009). This model yields parameters virtually identical to the LIML method described above, but allows us to appropriately scale these parameters down to account for the impact of upper limit censoring and thus estimate marginal effects that avoid overstating any causal effect that we find. This makes a large difference in results as will be seen below. Both the IV LIML models and IV Tobit models are estimated with robust standard errors.

We estimate the following equations with corrected standard errors:

$$(1) \text{Ln}(\text{Outcome}) = \beta_0 + \beta_1 \hat{F} + \beta_2 D + \beta_3 \text{DSM} + \beta_4 C + \beta_5 Y + \varepsilon$$

$$(2) F = \alpha_0 + \alpha_1 IV + \alpha_2 D + \alpha_3 DSM + \alpha_4 C + \alpha_5 Y + \eta$$

where Outcome represents outcomes of services, Ln represents the natural logarithm, F is the number of months an individual has continuously participated in the FSP program (or, alternatively, F is a dummy variable indicating whether a client has had any participation in the FSP program), and \hat{F} refers to the predictions from equation (2). The vector D contains variables for sex, race/ethnicity (White, African-American, Asian/Pacific Islander, Hispanic, other), and age (ages 18 to 25, 26 to 34, 35 to 44, 45 to 54, 55 to 64, 65 to 74, 75 and older). The vector DSM contains psychiatric diagnostic indicators (schizophrenia, bipolar disorder, depression, anxiety disorder, personality disorder, substance abuse, alcohol abuse, other disorder, unable to diagnose). The vector C contains county-level fixed effects. County-level fixed effects account for all non-time varying differences across counties and parametrically account for the clustering of clients by county. The vector Y contains year fixed effects. Finally, IV contains a vector of instrumental variables. The symbols ε and η refer to the error terms.

There are two instruments. The first is an indicator of whether a consumer received help in completing the CPS from a paid staff member. A paid staff member includes the consumer's case manager or clinician, a staff member other than the consumer's case manager or clinician, and professional interviewers. This instrument is a proxy for the literacy level of a consumer: the help indicator.

Nationally, a self-reported mental health problem is associated with lower literacy, even after controlling for sociodemographics including educational level. This is consistent with research indicating that individuals with SMI have relatively low literacy, even among some whose education level is high (Grace and Christensen 1998; Christensen and Grace 1999). In a

study by Lincoln et al. (2006), low literacy was positively correlated to depressive symptoms, but was not related to mental health-related quality of life in well-controlled regression models. In addition, limited literacy has been positively correlated with having a psychotic disorder (Lincoln et al. 2008). As a proxy for low literacy, we expect the help indicator to be positively associated with the probability of entering the FSP program, and, conditional on the inclusion of psychiatric diagnoses in the second-stage equation, exogenous to mental health outcomes.

In order to statistically test the exogeneity of the help indicator using an overidentification test, we must include a second instrument that is clearly exogenous. This instrument is the season of a consumer's birth. While unfamiliar to most non-psychologists/psychiatrists, the relationship between season of birth and psychiatric diagnosis is well established through over 100 studies that have examined the relationship between mental illness and season of birth. For a review that also explores the possible reasons for this relationship, see Castrogiovanni et al. (1998). Individuals born in the winter and spring are more likely to develop schizophrenia, individuals born in the first quarter of the year are more likely to have bipolar disorders and major depressive disorder, and individuals with seasonal affective disorder are more likely to be born in May (Castrogiovanni et al. 1998). This suggests that those born during the months from October through May will be consumers with specific psychiatric diagnoses. Thus, our instrument indicates being born during these months.

Because consumers born during these months are overrepresented among consumers, such consumers will necessarily be more likely to enter the FSP program simply because there are proportionately more of them, other things equal. We refer to this instrument as the season-of-birth indicator. Conditional on the inclusion of psychiatric disorders in the second-stage equation, this instrument will be exogenous to mental health outcomes.

Results

Testing of the instruments was performed using the LIML equations as shown in Tables A1 and A2. In Table A1, the Cragg-Donald Wald F -statistic for the joint statistical significance of the instruments was 10.34 which is greater than the critical value for 10% maximal LIML size, 8.68, showing that the instruments are sufficiently strong. The corresponding statistic in Table A2 is 21.18, which is also larger than the critical value of 8.68. Note that the Stock and Yogo (2005) critical values when using two-stage LIML are legitimately smaller than the Stock and Yogo (2005) critical values when using two-stage least squares.

[Table A1 placed approximately here]

[Table A2 placed approximately here]

The inclusion of the two instruments in the main equation (equation 1) along with the original values of \underline{F} and estimating using ordinary least squares with robust standard errors shows that the instruments have parameters close to zero and are not statistically significant at the 5% level either singly or jointly (equation using monthly participation measure: help index, parameter = 0.006, $p=0.12$; season of birth, parameter = 0.004, $p=0.12$; partial \underline{F} -test of set of instruments, $p=0.09$; equation using any participation indicator: help index, parameter = 0.006, $p=0.13$; season of birth, parameter = 0.004, $p=0.12$; partial \underline{F} -test of set of instruments, $p=0.09$) supporting the assumption that neither instrument directly influences outcomes and that each is conditionally independent of outcomes. In addition, in reduced-form equations, both instruments are positively signed.

Finally, overidentification tests of the instruments failed to reject the hypothesis that the overidentifying instrument, the help index, is exogenous. In Table A1, the Hansen's J statistic is 0.003 ($p=0.95$) and in Table A2 the corresponding statistic is 0.91 ($p=0.34$). In addition, in Table A1, the exogeneity of time in the FSP program was rejected (χ^2 : 4.91, $p=0.03$) indicating the instruments were necessary to obtain reliable estimates of the causal effect of the FSP program. The corresponding statistic in Table A2 rejects the exogeneity of any participation in the FSP program (χ^2 : 3.81, $p=0.05$).

Note the large differences between the parameter on "Any participation in FSP" in Tables 5 and A2. The model in A2 predicts values outside of the [1, 5] interval, while the model in Table 5, which accounts for censoring from the right, only predicts values within the [1, 5] interval, yielding much smaller and more credible marginal effects.

REFERENCES

Angrist, J., & J. Pischke. (2009). *Mostly Harmless Econometrics: An Empiricist's Companion*.

Princeton (NJ): Princeton University Press.

Baum, C., Schaffer M. & Stillman, S. (2007). ivreg2: Stata module for extended instrumental variables/2SLS, GMM and AC/HAC, LIML and k-class regression. Retrieved May 2,

2012, from <http://ideas.repec.org/c/boc/bocode/s425401.html>

Bianconi, J., Mahler, J. & McFarland, B. (2006). Outcomes for rural Medicaid clients with severe mental illness in fee for service versus managed care. *Administration and Policy in Mental Health and Mental Health Services Research* 33, 411-422.

Brown, T., Choi, S., Chung, J., Felton, M. & Scheffler, R. (2010). A comparison of satisfaction, services characteristics and outcomes in the full service partnership programs relative to

- usual care. Nicholas C. Petris Center on Health Care Markets and Consumer Welfare. Petris Report #2010-1. Retrieved January 18, 2013, from http://www.dmh.ca.gov/prop_63/MHSA/Publications/docs/1_Petris%20Center_FSP_v_nonFSP_Final.pdf
- Brown, T., Chung, J., Choi, S., Scheffler, R., Adams, N. (2012). The Impact of California's Full-Service Partnership Program on Mental Health-Related Emergency Department Visits. *Psychiatric Services* 63, 802-807.
- California Code of Regulations. (2010). Title 9.Rehabilitative and Development Services. Division 1. Department of Mental Health. Chapter 14. Mental Health Services Act Section. Section § 3620.05.
- California Department of Mental Health. (2008). *Performance Outcomes Data Collection & Submission Training Manual*. Retrieved May 2, 2012, from http://www.dmh.ca.gov/POQI/docs/Performance_Outcomes_Manual_FINAL.pdf
- California Department of Mental Health. (2009). Performance Outcomes and Quality Improvement (POQI): Consumer Perception Surveys. Retrieved May 2, 2012, from http://www.dmh.ca.gov/POQI/Consumer_Perception_Surveys.asp
- California Department of Mental Health. (2011). Performance outcomes system documents. Retrieved May 2, 2012, from <http://www.dmh.ca.gov/POQI/Documents.asp>
- Cameron, A. C., & Trivedi, P. K. (2009). *Microeconometrics Using Stata*. College Station (TX): State Press.
- Castrogiovanni, P., S. Ipachino. C. Pacchierotti and F. Pieraccini. (1998). Season of birth in psychiatry: a review. *Neuropsychobiology* 37, 175-181.

- Christensen, R., & Grace, G. (1999). The Prevalence of Low Literacy in an Indigent Psychiatric Population. *Psychiatric Services* 50, 262-263.
- Eisen, S., Shaul, J., Leff, H., Stringfellow, V., Clarridge, B., & Cleary, P. (2001). Toward a national consumer survey: evaluation of the CABHS and MHSIP instruments. *Journal of Behavioral Health Services and Research* 28, 347-369.
- Felton, M., C. Cashin, & T. Brown. (2010). What does it take? California county funding requests for recovery-oriented full service partnerships under the Mental Health Services Act. *Community Mental Health Journal* 46, 441-451.
- Gilmer, T., Stefancic, A., Ettner, S., Manning, W. & Tsemberri, S. (2010). Effect of full-service partnerships on homelessness, use and costs of mental health services, and quality of life among adults with serious mental illness. *Archives of General Psychiatry* 67, 645-65.
- Grace, G., & Christensen, R. (1998). Literacy and mental health care. *Psychiatric Services* 49, 7.
- Hayashi, F. 2000. *Econometrics*. Princeton (NJ): Princeton University Press.
- Leff, H., Wieman, D., McFarland, B., Morrissey, J., Rothbard, A., Shern, D., Wylie, A., Boothroyd, R., Stroup, T., & Allen, I. (2005). Assessment of Medicaid managed behavioral health care for persons with serious mental illness.” *Psychiatric Services* 56, 1245.
- Lincoln, A., Paasche-Orlow, M., Cheng, D., Lloyd-Travaglini, C., Caruso, C., Saitz, R., & Samet, J. (2006). Impact of health literacy on depressive symptoms and mental health-related quality of life among adults with addiction. *Journal of General Internal Medicine* 21, 818-822.
- Lincoln, A., Espejo, D., Johnson, P., Paasche-Orlow, M., Speckman, J., Webber, T. & White, R. (2008). Limited literacy and psychiatric disorders among users of an urban safety-net

hospital's mental health outpatient clinic. *Journal of Nervous and Mental Disease* 196, 687-693.

Mental Health Statistics Improvement Program. (2011). Retrieved May 2, 2012, from <http://www.mhsip.org/>.

Miller, L., Brown, T., Pilon, D., Scheffer, R. & Davis, M. (2010). Patterns of Recovery from Severe Mental Illness: A Pilot Study of Outcomes. *Community Mental Health Journal* 46, 177–187.

Stock, J. & Yogo, M. (2005). Testing for weak instruments in linear IV regression. In *Identification and Inference for Econometric Models: A Festschrift in Honor of Thomas J. Rothenberg*, edited by D. W. K. Andrews & J. H. Stock (Eds.), (pp. 80-108). Cambridge: Cambridge University Press.

UCLA Center for Healthier Children, Youth, and Families. (2012). Full service partnerships: California's investment to support children and transition-age youth with serious emotional disturbance and adults and older adults with severe mental illness. Retrieved January 17, 2013, from http://mhsoac.ca.gov/Meetings/docs/Meetings/2012/Nov/OAC_111512_Tab4_MHSA_CostOffset_Report_FSP.pdf

Wooldridge, J. (2002). *Econometric Analysis of Cross Section and Panel Data*. Cambridge (MA): The MIT Press.

Wooldridge, J. (2006). *Introductory Econometrics*, 3rd ed. Thomson/South-Western.

Yoon, J., Bruckner, T. & Brown, T. (forthcoming). Client characteristics that influence recovery in California's comprehensive community mental health programs. *American Journal of Public Health*.

TABLES

Table 1: Mental health services available in usual care and the FSP program^a

<p>Services available to all clients (FSP and usual care)</p> <ul style="list-style-type: none"> Assessment Care planning Targeted case management Pharmacotherapy Counseling and psychotherapy Rehabilitation Crisis intervention Crisis stabilization Day treatment Day rehabilitation Crisis residential treatment Adult residential treatment Inpatient treatment
<p>Additional services and supports available to clients in the FSP program</p> <ul style="list-style-type: none"> Needs assessment (more comprehensive) Individual Services and Supports Plan development (more comprehensive) Increased access to field-based over office-based services Alternative and culturally-specific treatment Supportive services with regard to housing, employment, and education Personal service coordination and case management (including transportation and reduced caseloads) Family education Wellness centers Peer support services Basic needs support: food, clothing, and shelter Cost of health care treatment Cost of treatment for co-occurring conditions, such as substance abuse Respite care

FSP: Full Service Partnership

^a FSP information from the California Code of Regulations Title 9 (3). Usual care information from California’s Medicaid State Plan, Section 3.1, Supplement 3 to Attachment 3.1-A (Limitations on Services: Rehabilitative Mental Health Services and Substance Abuse Treatment).

Table 2: Perception of Outcomes of Services

Questions [†]
1. I deal more effectively with daily problems.
2. I am better able to control my life.
3. I am better able to deal with crisis.
4. I am getting along better with my family.
5. I do better in social situations.
6. I do better in school and/or work.
7. My housing situation has improved.
8. My symptoms are not bothering me as much.

[†]Each question is evaluated according to a five-point Likert scale where “strongly disagree” is equal to one and “strongly agree” is equal to five. Per California Department of Mental Health protocol, scoring was determined as follows: (a) the total score was determined by summing the numerical answers to each question and dividing by the total number of questions answered; (b) scores were only calculated for observations where at least two-thirds of the items were responded to (6 of 8 questions). Forty percent of respondents in the analytic sample answered less than 8 questions. The final scores range from one to five.

Table 3: Descriptive Statistics – Analytic Sample

Variable	Mean \pm SD [†]
Outcome Measures	
Outcomes of Services	3.878 \pm 0.784
FSP Participation	
Length of time in FSP (months) (15.7 \pm 16.4 if in FSP)	0.232 \pm 2.748
Any participation (588 observations)	0.015
Psychiatric Diagnoses	
Schizophrenia	0.494
Bipolar disorder	0.342
Depression	0.497
Anxiety disorder	0.266
Personality disorder	0.147
Substance abuse	0.262
Alcohol abuse	0.071
Other disorder	0.203
Unable to diagnose	0.343
Demographics	
Female	0.564
White	0.568
African-American	0.128
Asian/Pacific Islander	0.071
Hispanic	0.268
All other ethnic groups	0.214
Age 18-25	0.066
Age 26-34	0.140
Age 35-44	0.250
Age 45-54	0.323
Age 55-64	0.174
Age 65-74	0.038
Age 75 and over	0.008
Year	
2005	0.250
2006	0.258
2007	0.311
2008	0.181
Instruments	
Help indicator	0.096
Season of birth	0.656
Observations	39,681

[†]SD: standard deviation (only reported for continuous variables)

Table 4: Logarithm of Outcomes of Service: FSP vs. Usual Care (Months of Participation)

Variable	IV Tobit Second Stage		Tobit	
	Marginal effect	z-statistic	Marginal effect	z-statistic
FSP participation				
Months in FSP	0.035*	1.99	0.000†	0.87
Psychiatric Diagnoses				
Schizophrenia	0.017**	3.89	0.024**	9.83
Bipolar disorder	-0.002	-0.86	-0.001	-0.62
Depression	-0.032**	-9.59	-0.028**	-12.28
Anxiety disorder	-0.019**	-6.89	-0.020**	-7.51
Personality disorder	-0.017**	-4.62	-0.017**	-5.16
Substance abuse	0.004	1.05	0.007**	2.89
Alcohol abuse	-0.014*	-2.14	-0.006	-1.40
Other disorder	0.000	-0.17	0.001	0.29
Unable to diagnose	-0.006	-1.47	0.000	-0.01
Demographics				
Female	-0.004	-1.44	-0.006**	-2.57
African-American	-0.011**	-2.76	-0.009**	-2.54
Asian/Pacific Islander	0.002	0.56	0.000	-0.04
Hispanic	0.038**	9.95	0.034**	12.42
All other ethnic groups	-0.013**	-3.74	-0.010**	-3.56
Age 26-34	0.003	0.60	-0.001	-0.19
Age 35-44	-0.002	-0.35	-0.006	-1.41
Age 45-54	-0.004	-0.73	-0.011*	-2.37
Age 55-64	0.015**	2.78	0.012**	2.54
Age 65-74	0.041**	6.30	0.046**	8.09
Age 75 and over	0.033**	2.67	0.040**	3.78
Year				
2006	-0.001	-0.42	-0.003	-0.96
2007	0.011**	3.40	0.012**	4.37
2008	0.002	0.20	0.017**	5.47
Wald χ^2 /F-test	1290.47**		22.53**	
Observations	39,681		39,681	

County fixed effects included but not reported. All marginal effects are estimating assuming the upper limit is binding and have been transformed to proportion change using the formula:

$\exp(\text{parameter}) - 1$

†: 0.0004

** : statistically significant 1% level (two-tailed)

* : statistically significant 5% level (two-tailed)

Table 5: Logarithm of Outcomes of Service: FSP vs. Usual Care (Any Participation)

Variable	IV Tobit Second Stage		Tobit	
	Marginal effect	z-statistic	Marginal effect	z-statistic
FSP participation				
Any participation in FSP	0.334**	7.76	0.014	1.73
Psychiatric Diagnoses				
Schizophrenia	0.019**	4.95	0.024**	9.80
Bipolar disorder	-0.004	-1.45	-0.002	-0.65
Depression	-0.032**	-10.16	-0.028**	-12.31
Anxiety disorder	-0.019**	-6.83	-0.020**	-7.50
Personality disorder	-0.017**	-5.05	-0.017**	-5.17
Substance abuse	0.003	0.71	0.007**	2.86
Alcohol abuse	-0.011*	-2.09	-0.006	-1.42
Other disorder	-0.002	-0.58	0.001	0.27
Unable to diagnose	-0.002	-0.77	0.000	-0.01
Demographics				
Female	-0.004	-1.72	-0.006**	-2.56
African-American	-0.012**	-3.01	-0.009**	-2.56
Asian/Pacific Islander	0.001	0.27	0.000	-0.03
Hispanic	0.036**	11.72	0.034**	12.42
All other ethnic groups	-0.011**	-3.67	-0.010**	-3.56
Age 26-34	0.010	1.23	-0.001	-0.14
Age 35-44	0.004	0.49	-0.006	-1.36
Age 45-54	0.000	0.02	-0.011*	-2.31
Age 55-64	0.020**	3.00	0.012**	2.57
Age 65-74	0.046**	7.45	0.046**	8.10
Age 75 and over	0.036**	2.95	0.040**	3.78
Year				
2006	-0.002	-0.77	-0.003	-0.97
2007	0.007	1.69	0.012**	4.32
2008	-0.002	-0.18	0.017**	5.34
Wald χ^2 / F-test	1354.81**		22.59**	
Observations	39,681		39,681	

County fixed effects included but not reported. All marginal effects are estimating assuming the upper limit is binding and have been transformed to proportion change using the formula: $\exp(\text{parameter}) - 1$

** : statistically significant 1% level (two-tailed)

* : statistically significant 5% level (two-tailed)

Table A1: Logarithm of Outcomes of Services: FSP vs. Usual Care (Months of Participation)

Variable	FSP Participation First Stage (LIML)		Outcomes of Services Second Stage (LIML)		Outcomes of Services OLS	
	parameter	t	parameter	t	parameter	t
FSP participation						
Months in FSP	-	-	0.040*	2.00	0.000†	0.87
Psychiatric Diagnoses						
Schizophrenia	0.189**	5.47	0.019**	3.90	0.027**	9.82
Bipolar disorder	0.024	0.78	-0.003	-0.86	-0.002	-0.62
Depression	0.134**	4.31	-0.037**	-9.60	-0.032**	-12.28
Anxiety disorder	-0.010	-0.38	-0.022**	-6.93	-0.022**	-7.55
Personality disorder	0.003	0.07	-0.019**	-4.65	-0.019**	-5.19
Substance abuse	0.106**	2.75	0.004	1.05	0.008**	2.89
Alcohol abuse	0.251**	2.82	-0.017*	-2.16	-0.007	-1.41
Other disorder	0.031	0.95	-0.001	-0.17	0.001	0.29
Unable to diagnose	0.163**	6.23	-0.007	-1.48	0.000‡	-0.01
Demographics						
Female	-0.050	-1.77	-0.004	-1.44	-0.006**	-2.57
African-American	0.068	1.44	-0.013**	-2.77	-0.010**	-2.55
Asian/Pacific Islander	-0.083	-1.77	0.003	0.56	0.000	-0.04
Hispanic	-0.151**	-4.42	0.044**	9.86	0.038**	12.31
All other ethnic groups	0.086*	2.08	-0.015**	-3.76	-0.012**	-3.57
Age 26-34	-0.126*	-2.19	0.004	0.60	-0.001	-0.19
Age 35-44	-0.131**	-2.59	-0.002	-0.35	-0.007	-1.41
Age 45-54	-0.186**	-3.80	-0.005	-0.73	-0.012*	-2.37
Age 55-64	-0.087	-1.57	0.017**	2.77	0.014**	2.52
Age 65-74	0.089	0.92	0.048**	6.14	0.052**	7.87
Age 75 and over	0.142	0.89	0.038**	2.61	0.045**	3.69
Year						
2006	-0.043	-1.42	-0.002	-0.42	-0.003	-0.97
2007	0.043	1.24	0.012**	3.39	0.014**	4.36
2008	0.440**	9.13	0.002	0.20	0.020**	5.44
Instrumental variables						
Help indicator	0.147**	2.56	-	-	-	-
Season of birth	0.092**	3.60	-	-	-	-
Constant	-0.302**	-4.41	1.371**	69.23	1.361**	71.28
F-statistic	6.14**		31.88**		22.49**	
Cragg-Donald Wald F-statistic	10.34 > 8.68 critical value (10% maximal LIML size)					-
Hansen's J	0.003 (p=0.95)					-
Exogeneity of FSP (χ^2)	4.91 (p=0.03)					-
Observations	39,681					39,681

County fixed effects included but not reported.

†0.0004, ‡ 0.00003

** : statistically significant 1% level (two-tailed); * : statistically significant 5% level (two-tailed)

Table A2: Logarithm of Outcomes of Services: FSP vs. Usual Care (Any Participation)

Variable	FSP Participation First Stage (LIML)		Outcomes of Services Second Stage (LIML)		Outcomes of Services OLS	
	parameter	t	parameter	t	parameter	t
FSP participation						
Any participation in FSP	-	-	0.584†	1.91	0.016	1.71
Psychiatric Diagnoses						
Schizophrenia	0.010**	6.42	0.021**	5.02	0.027**	9.79
Bipolar disorder	0.005**	3.79	-0.005	-1.46	-0.002	-0.65
Depression	0.008**	5.64	-0.037**	-10.27	-0.032**	-12.3
Anxiety disorder	-0.002	-1.18	-0.021**	-6.87	-0.022**	-7.54
Personality disorder	0.001	0.47	-0.020**	-5.08	-0.019**	-5.19
Substance abuse	0.009**	5.67	0.003	0.71	0.008**	2.85
Alcohol abuse	0.011**	3.21	-0.013*	-2.11	-0.007	-1.42
Other disorder	0.005**	2.76	-0.002	-0.58	0.001	0.27
Unable to diagnose	0.004**	2.68	-0.003	-0.77	0.000	-0.01
Demographics						
Female	-0.003*	-2.08	-0.005	-1.73	-0.006**	-2.56
African-American	0.007**	3.26	-0.014**	-3.03	-0.010**	-2.57
Asian/Pacific Islander	-0.003	-1.56	0.001	0.27	0.000	-0.03
Hispanic	-0.005**	-2.93	0.040**	11.65	0.038**	12.32
All other ethnic groups	0.002	1.03	-0.013**	-3.68	-0.012**	-3.57
Age 26-34	-0.020**	-5.56	0.011	1.24	-0.001	-0.14
Age 35-44	-0.020**	-5.57	0.004	0.49	-0.007	-1.36
Age 45-54	-0.022**	-6.17	0.000	0.02	-0.012**	-2.32
Age 55-64	-0.016**	-4.43	0.023**	3.00	0.014**	2.56
Age 65-74	-0.002	-0.45	0.053**	7.24	0.052**	7.88
Age 75 and over	0.005	0.55	0.041**	2.89	0.045**	3.68
Year						
2006	-0.001	-1.18	-0.003	-0.77	-0.003	-0.97
2007	0.010**	7.74	0.008	1.71	0.014**	4.31
2008	0.038**	15.84	-0.002	-0.19	0.019**	5.31
Instrumental variables						
Help indicator	0.012**	4.63	-	-	-	-
Season of birth	0.003*	2.24	-	-	-	-
Constant	-0.010**	-2.54	1.366**	70.67	1.361**	71.28
F-statistic	9.23**		20.50**		21.97**	
Cragg-Donald Wald F-statistic	21.18 > 8.68 critical value (10% maximal LIML size)					
Hansen's J	0.91 (p=0.34)					
Exogeneity of FSP (χ^2)	3.81 (p=0.05)					
Observations	39,681			39,681		

County fixed effects included but not reported.

†p=0.057

** : statistically significant 1% level (two-tailed); * : statistically significant 5% level (two-tailed)