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Training Program Impacts and the Onset of the Great Recession

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ABSTRACT

In the context of the Great Recession, we examine how the impacts of training shifted during a period when theory suggests they might have the greatest potential to improve individual and societal well-being. Using particularly rich data from the state of Missouri for participants in the WIA Adult and Dislocated Worker and the Trade Adjustment Assistance programs over the period 2007-2010, we estimate program impacts, comparing outcomes for participants receiving training in one of these programs with a comparison group of individuals receiving only Wagner-Peyser services. Individuals who have the same demographic characteristics, prior employment and earnings histories, and local labor markets are matched to maximize the likelihood that the estimates reflect causal training impacts. Making comparisons of impacts before and after the onset of the recession allows us to test the claim that the net benefits of training increase during recessionary periods. Our preliminary findings do not suggest that training impacts are larger when participants enter training in recessionary periods.

Introduction

By most measures, the economic downturn of 2007-2009, often referred to as the "Great Recession," was one of the most severe since the Great Depression, inducing a decline of 3 percent in U.S. gross domestic product and a decline of more than 8 percent in personal disposable income. Labor market distress has been particularly acute, with average duration of unemployment during the recession higher than in any post-war recession. The national unemployment rate peaked near 10 percent in late 2009; as of the spring of 2014, it has fallen below 7 percent, although some of this decline is attributed to workers exiting the labor market. Indeed, the number of workers that have left the labor market is substantial, causing a decline in the employment-to-population ratio from 63.0 to 59.3 percent (Moffitt, 2013).

The American Recovery and Reinvestment Act (ARRA) of 2009 allocated $2.95 billion in additional funds to the Workforce Investment Act (WIA), approximately doubling the 2008 level of funding, in an effort to raise individual skill levels and improve job seekers' prospects (National Skills Coalition, 2011). Although this funding was motivated in part by a concern to provide benefits to those facing economic hardship, it is widely believed that increased emphasis on training during a recession may be efficient, in large part due to reduced opportunity costs of training. However, there is little empirical evidence on this issue, as we discuss below, and there appear to be no such studies focused on the impact of the economy on U.S. training program outcomes.

In the analysis here, we examine impacts of training over the period 2007-2010, using particularly rich data from the state of Missouri for participants in the Workforce Investment Act Adult (WIA Adult) and Dislocated Worker (WIA DW) and the Trade Adjustment Assistance (TAA) programs over the period 2007-2010. We estimate program impacts, comparing

outcomes for participants receiving training in these programs with a comparison group of individuals participating in the Wagner-Peyser program,[1] as the local economy declined and then began to slowly recover. Individuals who have the same demographic characteristics, prior employment and earnings histories, and local labor markets are matched to maximize the likelihood that the estimates reflect causal training impacts.

If we were to find that the net benefits of training were greater during the recent Great Recession, this would argue for a set of activities that governments could usefully undertake during economic downturns to promote additional skills acquisition through training, mitigate negative effects of being out of work and pave a pathway to stronger future growth. However, our preliminary findings do not support the precept that individual gains from training are larger when participants enter training during a recession. We suggest possible explanations for the pattern of results we find but also qualify our findings based on the limitations of our data and methods.

Evidence on Training Program Impacts and the Role of the Business Cycle

Approximately four decades of research on employment and training programs confirms that adults benefit, on average, from training. The bulk of average impact estimates come from U.S. program evaluations (of the Job Training Partnership Act and WIA) and range from $320 to $887 in earnings per quarter for participants (Andersson et al. 2013; Bloom et al., 2003; Decker, 2011; Heinrich et al., 2008; Hollenbeck et al., 2005). Some of these studies also translate earnings effects into percentage terms, with estimated effects (earnings increases) of training programs in the U.S. and abroad ranging from about 5 to 26 percent of average earnings (Bloom

[1] The Wagner-Peyser program comprises individuals who seek job search, employment exchange and related services through the federal Employment Service system. As we note below, these services are very inexpensive and are of limited intensity.

et al., 2003; Caliendo et al., 2011; Decker, 2011; Fares and Puerto, 2009; Greenberg et al., 2005; Haelermans & Borghans, 2011; Heinrich et al., 2008; Hollenbeck et al., 2005). Estimated effects of training on the probability of employment are also positive and statistically significant across a majority of studies. The estimates of employment increases range from about 5 to 29 percentage points (measured monthly or quarterly), with some differences observed between women and men, and by specific training type and time following program entry (Caliendo et al., 2011; Card et al., 2010; Decker, 2011; Fares and Puerto, 2009; Heinrich et al., 2008; Hollenbeck et al., 2005).

One of the most commonly provided types of training is vocational training, which a majority of studies find to be effective in increasing adult earnings. However, the research base also consistently reports that there are initial "lock-in" effects of vocational training, with early negative impacts that turn positive and increase over time (Andersson et al., 2013; Caliendo et al., 2011; Card et al, 2010; Decker, 2011; Heinrich et al., 2008; Schochet et al., 2006; van Ours, 2004). Participation in training tends to reduce job search, and employment and earnings in the short run, but by about 18-24 months after program entry, program impacts typically turn positive and then grow for at least several years.

The evidence base is also fairly consistent in finding considerably smaller impacts on employment and little or no impacts on earnings of training programs targeted toward dislocated workers in the U.S. (Andersson et al., 2013; Decker et al., 2011; Heinrich et al., 2008; Hollenbeck and Huang, 2006; Social Policy Research Associates, 2013). In general, it appears that the "lock-in effects" (or foregone earnings associated with training) are more costly for dislocated workers, who tend to have stronger (higher) earnings histories than the average training program recipient. The most recent study of U.S. trade adjustment assistance programs

suggests that dislocated worker trainees fare better after training when they find employment in their training field and when they receive a degree or certificate through training, particularly women who receive training in health care professional fields (Social Policy Research Associates, 2013).

These findings on job training program effectiveness raise the question of whether the opportunity costs of training might be lower, and the ultimate impacts larger, when training is undertaken when labor market prospects are poorer. However, if employers are not hiring or opening jobs following voluntary quits, improving one's skills may be of little help when one subsequently pursues employment. Thus, the timing of labor market entry in the course of the business cycle is likely to play a critical role in determining training program effects, and the magnitude and direction of those effects are probably best explored empirically in a given local labor market context.

Only a few studies directly address the importance of the business cycle for individual outcomes of training programs— none of which use U.S. labor market or training program data—and they report conflicting findings. Kluve's (2007) review of European studies found little or no difference in estimated impacts of training based on the business cycle. In contrast, Lechner and Wunsch's (2006) ten-year study of a German job training program found substantially greater program impacts during economic downturns, due to smaller negative lock-in effects and larger positive long-run effects when individuals started the programs at times of high unemployment .

In a study using Norwegian data, covering the years 1991-1997, Raaum et al. (2002) investigated the role of business cycles for short-term and medium-term individual outcomes of a labor market training program (the LMT). The unemployment rate had increased from 1.5

percent in 1987 to a peak of 5.5 percent in 1993, before declining to 3.3 percent in 1997. Accordingly, the average number of LMT participants increased from 7,000 in 1987 to 57,000 in 1993, suggesting a strong role for the LMT in assuaging the potential negative market effects of cyclical unemployment.[2] The average impact of the LMT on annual earnings over the period of their study was positive and statistically significant, with positive training effects persisting after three years. At the same time, based on the estimation of a large number of group- and cohort-specific training effects, Raaum et al. found that the average effect of training on the trained varied substantially over the business cycle. Training program participants gained more when job opportunities in the post-training period were favorable, while program effects were significantly lower when national or local labor markets were experiencing high unemployment and few transitioned from unemployment to jobs.

The recent Great Recession presents a unique opportunity to investigate the influence of the business cycle on public training program effects in the U.S. Although it might be of interest to use variation in the depth or extent of the recession across states and localities to explore these relationships, the detailed data necessary for these analyses are hard to come by. We take advantage of the availability of rich training program and wage record data made available by the state of Missouri, as well as a sharp increase in unemployment in Missouri during the recession, to undertake these analyses.

Study Data

Data used in these analyses were produced by Missouri's Department of Economic Development as part of the Workforce Data Quality Initiative pursuant to funding by the U.S. Department of Labor. The ultimate source for each dataset was a Missouri agency charged with maintaining the

[2] From 1993 to 1997 (following the recession), participation in the LMT decreased from 57,000 to 23,000, and by 1999, the number of participants was down to 8,000.

data for the purpose of administering programs focused on serving residents in the state. Lists of participants, providing demographic and related information, for those entering the WIA Adult, WIA Dislocated Worker, Trade Adjustment Assistant and Wagner-Peyser programs, in the period July 2007-June 2010 were provide by the Division of Workforce Development. Wage record data, information on quarterly earnings for 2007-2011 maintained in support of the state's Unemployment Insurance system, were provided by the Department of Labor and Industrial Relations. Wage record data provide information on all individuals working in firms within the state that are required to report information under Unemployment Insurance legislation. Omitted are earnings from informal and illegal employment, federal or military employment, and employment outside the state. Notwithstanding these omissions, earnings measures based on these kinds of data are comparable in accuracy to those obtained in surveys, and studies suggest that program evaluations using such data do not suffer important biases (Wallace and Haveman, 2007).

The Training Programs and Economic Environment in Missouri

These training programs faced particularly dramatic challenges with the onset of the Great Recession. Although the NBER declared the recession's start to be in December 2007, the recession had only a modest impact on Missouri's unemployment rate in the beginning of 2008. Figure 1 shows that unemployment in the state increased moderately through the middle of 2008, gradually accelerating and then jumping dramatically at the end of the year and in the first months of 2009. The recession formally ended in June 2009 as the U.S. gross national product began to grow again. Missouri reach a peak unemployment rate of 9.7 percent in August of

2009, but the unemployment rate in Missouri was over 9 percent through 2010 and remained over 7 percent through most of 2012.[3]

The three programs differ somewhat in their target populations. The WIA Adult program is focused on individuals who have faced labor market difficulties for extended periods, frequently those who have suffered repeated periods of unemployment and low-wage employment. The WIA Dislocated Worker program is designed to aid workers who have lost their jobs, often as a result of layoffs associated with business cycles or industry-specific declines. Many of these individuals had extended periods of stable employment at relatively high wage levels prior to getting laid off. Finally, the TAA program is concerned with helping those who have lost their jobs because of increased import competition or shifts in production to outside the U.S. Like WIA DW participants, prior earnings for this group were often substantial. Notwithstanding these differences, the goal for each program is to provide training and related services to help workers achieve labor market success.

For the WIA programs, the Missouri Career Center (or One-Stop center) that operates under the Employment Service is often an initial point of contact for individuals expressing an interest in training, and they are often referred to WIA program representatives within the center. Admission decisions are made by staff based on eligibility criteria, and admission may be selective during times when slots are scarce. In contrast, federal certification identifies individuals who are eligible to participate in the TAA program, and individuals are informed that they are eligible for the program.

Information on the three programs over the period July 2007-June 2010 is provided in Table 1. First implemented in Missouri in 2000, the two WIA programs provided services for up

[3] Based on seasonally adjusted monthly unemployment.

to 15,000 participants per year.[4] In most years, 35-50 percent of participants received training. The TAA program remained small throughout the period, averaging about 2,000 annual participants and never serving over 4,000 in a year. The TAA program is designed to provide training or other relatively intensive services to most participants.

A glance at the first column of figures in Table 1 listing numbers of participants shows that the two WIA programs grew dramatically in the first two years with the onset of the Great Recession. Looking at year-on-year growth, we see that between program years 2007 (PY2007) and 2008 (PY2008),[5] the total number of WIA Adult participants grew by 40 percent, whereas the WIA DW program doubled in the same period. Given the focus on job losers, the relatively greater growth in the latter program is expected. The growth in the TAA program was ultimately even greater, but perhaps most notable was the extraordinary spike in the last quarter of calendar year 2008 and especially the subsequent quarter, when the financial crisis was most acute.

Table 1 also provides a portrait of the kinds of individuals who participated in the programs each quarter over the three years of our study. Throughout the period, the average participant was between 35 and 50 years of age, with the Adult program at the lower end of that range and the TAA program at the upper end. In all the programs, a majority of participants were female at the beginning of our period, although the proportion was substantially higher in the WIA Adult program. Similarly, the proportion African-American was higher in the WIA Adult program, initially over 40 percent, as compared to under 20 percent in the other programs.

[4] Beginning in July 2010, the state instituted major reforms that altered the character of the two WIA programs. In July 2010-June 2011, the WIA Adult program's annual enrollment increased to over 300,000 and the WIA DW program to nearly 200,000, with only a small proportion of those enrolled in either program receiving training. All analyses here are limited to those entering the programs in the period July 2007-June 2010, prior to the shift in policy.

[5] Program years begin in July of the specified year and extend to June of the following year, so, for example, PY2007 is July 2007-June 2008.

With the recession, the character of the program participants changed. The proportion male increased in all programs with the recession, exceeding 50 percent in the DW and TAA programs. This presumably reflects the relatively greater increase in male unemployment associated with the recession, which led some to dub this period a "mancession" (Rampell, 2009). The proportion African American in the WIA Adult program declined several percentage points with the onset of the recession, whereas in the other programs it increased slightly or showed little trend from its lower base point.

The last two columns of Table 1 indicate the kinds of services individuals received. WIA offers three levels of services. By definition, all individuals who enter the program receive "core" services, which are similar to basic labor market information and job search services provided to any individual who seeks labor market assistance at a state-run career center. In addition, WIA participants may also receive "intensive" services, which involve more extensive counseling, including personalized vocational testing, short courses and the like. Finally, those receiving intensive services may receive training as well, which includes classroom instruction, often provided under a voucher system, and on-the-job training. The proportion receiving either intensive services or training was in the range of 70-90 percent, with the proportion 5-10 percentage points higher for the DW program than the Adult program. In both programs, the proportion increased when the recession hit. The proportion receiving training varied over time in the two programs, but it appears to have increased quite substantially over the period of our study, exceeding 50 percent in the last year of the study. The classification of services was somewhat different in the case of the TAA program, but we have broken out the category of occupational and on-the-job training as the most comparable to the WIA training category. We see that generally about half of participants receive such training.

It is widely recognized that individuals who participate in training programs have often experienced recent labor market setbacks, so that their earnings decline over the several months prior to entry into a program. The decline in earnings has been referred to as the "Ashenfelter Dip" (Heckman and Smith, 1999). Although it might be assumed that such a decline would occur only for programs focused on displaced workers, this occurs with almost all training programs, including the WIA Adult program. Figures 2-4 provide information about earnings and employment for participants in each of the three programs by program year of entry, both prior to and after program entry. The Ashenfelter dip was present in a dramatic way for all three programs, and the patterns were at least broadly similar for those entering the program regardless of the program year.

There were important differences by program, however, especially in the levels of earnings and employment. In the WIA Adult program, four quarters prior to program entry, participants' quarterly earnings averaged between about $3,300 and $4,100, whereas in both other programs, earnings four quarters prior averaged between $7,000 and $13,000. Employment levels also differed in expected ways. For WIA Adult participants, the employment proportion was seldom over 70 percent four quarters prior, whereas, in the other two programs, this measure was generally over 90 percent. This is in keeping with the focus of the WIA Adult program on those with prior labor market difficulties, and the WIA DW and TAA programs on those who had lost jobs.

Figures 2-4 also suggest some interesting differences by entry period. In the WIA Adult program, those entering in PY2007 experienced an immediate improvement in earnings in the quarter following entry, with steady if declining growth over the following three years. For those entering in PY2008 and PY2009, during the worst labor market, earnings continued to

decline in the subsequent quarter before beginning a gradual improvement. In the case of the WIA DW and TAA programs, recovery was delayed an additional quarter for participants entering in *any* of the three periods. In all three programs, in the third year after program entry, earnings of the two groups that entered during the worst of the recession had caught up with earlier participants. This reflects the fact that in the third year after program entry, earlier participants were searching for employment in a very challenging labor market, whereas those who entered later were in a period when growth had begun to occur.

Although the patterns of employment and earnings are similar to one another in most cases, for the WIA Adult program there is a notable exception. Among participants entering in PY2007, the proportion employed remained over 60 percent until the last few quarters, with only a small dip in the quarter immediately prior to program entry, in contrast to the dramatic declines in employment experienced by those entering the program in the later periods. This difference underscores how the floundering economy affected employment. Of those entering the program in PY2008, in the four quarters prior to participation, close to 70 percent were employed, but employment declined to 60 percent in the quarter of program entry, and continued to decline to under 50 percent in the subsequent four quarters. The comparison between employment and earnings patterns suggests that although program participants prior to the recession experienced difficulties in finding *good* employment (in terms of wages or sufficient hours), they did not have trouble finding some kind of employment. Once the recession hit, a much larger proportion of participants had difficulty finding *any* employment.

In the case of the WIA DW and TAA programs, we see for participants in every period that job loss had an important role in inducing individuals to pursue training. For the TAA program, however, the decline was more dramatic, and employment was more central to

explaining earnings declines. TAA participants' quarterly earnings four quarters before entry were $9,000-$13,000, but they declined to under $3000 in the quarters after entry, and earnings displayed only modest recovery in the three following years. Levels of employment for TAA participants entering in PY2008 and PY2009 were in the range of 20-30 percent for several quarters following program entry, some 15-20 percentage points lower than comparable employment figures for the WIA DW program.

Program Impacts

The patterns reviewed in the previous section reflect a combination of participants' personal economic circumstances and the broad economic environment they face. The Ashenfelter Dip is understood to reflect the fact that individuals participate in a training program when they face setbacks in their employment circumstances, whether reflected in the loss of a long-time job, declining hours, or stagnating earnings. Since, even in the absence of effective training, circumstances tend to improve relative to such a trough, the growth in earnings and employment for program participants described above tells us very little about program impacts.

The first analyses below use individuals who received services under Wagner-Peyser legislation (participants in the U.S. Employment Service system) who were not subsequently enrolled in any of these training programs in order to estimate the likely outcomes that would have been achieved by program participants in the absence of participation.[6] This group, which we will refer to as the "ES comparison group," is appropriate as a comparison group because the Employment Service draws individuals seeking job search assistance. Like job training participants, they experience a dip in earnings and employment around the time of service

[6] Some individuals admitted into the WIA programs receive only Core services, which are essentially the same as those provided under Wagner-Peyser legislation. However, since WIA participants contribute to performance measures used to evaluate the WIA program, staff are likely to follow them more closely. As noted above, the majority of WIA participants receive services beyond the core level.

receipt. As a group, they differ from program participants both in terms of their particular employment difficulties and in their characteristics, but our methods identify those in the comparison group who have closely matched prior employment experiences, including prior efforts to obtain job search assistance, as well as personal demographic characteristics. Although Wagner-Peyser services may be of substantial value relative to their cost (often estimated to be a few hundred dollars per individual), they are low intensity services relative to training and are available to any individual who seeks them. If training provided by the programs is of value, the benefits of training are expected to overwhelm those produced by Wagner-Peyser services, so we do not expect serious bias due to receipt of such services in the comparison group.

Following our main analysis, we will contrast these results with those that use Unemployment Insurance (UI) claimants and recipients as the comparison group. Since UI is only available to those who have met certain employment and earnings criteria prior to program participation, those in our UI comparison group will be less likely to include those with unsteady employment. Since the WIA Adult program is focused on those with limited prior employment, it is less likely that the UI comparison group will be appropriate. On the other hand, the WIA Dislocated Worker and TAA programs are more likely to have held stable jobs for an extended period, so we may anticipate the UI comparison group may work well for them.

In the final section of our analysis, we present results of an alternative approach that attempts to match participants with nonparticipants who experienced job loss in the same firm. We limit consideration to those who appear to be permanently laid off, and by necessity these analyses are focused on relatively large firms that had substantial layoffs.

Our results above underscore the critical role of the macroeconomy in determining employment outcomes for training program participants. Our methods ensure that participants

are matched with comparison individuals who are seeking job search aid at the same time that participants enter the program, so that in comparing subsequent earnings and employment, we are comparing individuals who are facing the same economic environment.

In considering job training impacts, we need to recognize that, for many participants, earnings benefits may occur only with a substantial lag. This is both because time and attention are diverted from job search and work effort to classroom activities during the period of active participation (the "lock-in" effect), and because the benefits of training may not be fully realized at the completion of the program. Finding appropriate employment may be time consuming and training returns may accrue slowly even in the best job.

Methods

For each of the three programs, we undertook propensity score matching of participants with the comparison group (ES or UI) by gender and entry date. The method began with a sample consisting of participants of one gender who entered the program in one of the 12 calendar quarters, or in the case of TAA, for two calendar quarters.[7] This sample of participants was combined with the comparison sample observed during that same quarter (or pair of quarters in TAA). In the combined sample, we fitted a logit regression predicting participation in the training program, using as independent variables prior earnings patterns (for 12 prior quarters), prior participation in any of these training programs (quite uncommon), prior pursuit of Wagner-Peyser services (for the ES sample) or Unemployment Insurance receipt (for the UI comparison group), as well as age, race and education. In addition, we included a measure of the number of prior consecutive quarters of tenure (up to 12) with a one employer.

[7] For example, those participants entering the TAA program in the third and fourth quarters of calendar year 2007 were matched with a comparison group observed in those same quarters. A dummy indicating quarter was included as a matching variables.

Our initial analyses indicated unusual patterns of returns that resulted from severance pay received by workers, in some cases resulting in reported earnings in a single quarter that were appreciably greater than the annual earnings previously received by the individual from that same firm. Since individuals with severance pay would be expected to respond differently to job opportunities, we omitted anyone from both the participant and comparison group who appeared to receive severance pay.[8] In addition, for the WIA DW and TAA program participants and comparison cases, we found that one large employer (we call it Firm A), which laid off workers, recalled them, and then laid them off again, altered our results in varying ways. We ultimately omitted any case from both the participant sample and the comparison group that received any earnings from Firm A.[9]

We used the estimated propensity score (the predicted probability from this logit regression) to omit cases from each sample that were off the common support and then reran the logit regression on the remaining sample. We next weighted each comparison case by the odds ratio of the predicted propensity score. If the logit specification is correct, theory assures us that the weighted comparison sample will have the same distribution on all control variables (i.e., the logit variables) as the sample of participants. On the assumption of conditional independence, average earnings obtained for the matched comparison group provide an unbiased estimate of what earnings would have been for participants.

[8] Such cases were identified as follows: we examined each quarter in the interval four quarters prior to program entry through four quarters following program entry (nine quarters). If payment from a single employer in that quarter was over $25,000, the four quarters prior to that quarter were examined to see if any earnings were received from that employer. If that large payment was more than twice that of the maximum payment received from the employer in any of the prior four quarters, and the employer provided payments in at least two of those four quarters, then the payment was viewed as a severance payment, and the case was removed. The same criterion was used for comparison cases, although in this case the reference quarter replaced the quarter of program entry. This approach missed severance payments less than $25,000, but our view was that small payments would be hard to distinguish from regular earnings and would be less important in any event.

[9] We did not apply this selection to the WIA Adult program, since very few cases receive earnings from Firm A.

In order to assess whether the matching specification was correct, we undertook balancing tests. First we combined all quarters for a given gender and program, and performed a t-test on each mean for the difference between the participant samples and the weighted matched comparison sample. We were particularly concerned with assuring that earnings in the 12 quarters prior to program entry were properly controlled, and we examined these differences for each quarter. If any differences were statistically significant, we modified the logit specification, often omitting those participant cases with extreme values of propensity scores, which would be less likely to have good matches. In most cases, our final specification had no statistically significant differences between the participant and weighted matched comparison samples, although we accepted some specifications where the number of statistically significant differences could have been due to chance. In most cases, the standardized differences[10] in means for all variables in the accepted specifications were extremely small, almost always less than 0.01.[11]

Table 2 provide statistics on the sample size used in these analyses, identifying the impacts of the various restrictions. We see that omitting cases receiving severance pay had a substantial impact on the WIA DW sample, but proportionally, a much larger impact on the TAA sample. The losses in the TAA sample due to omission of those receiving payments from Firm A were also of importance. For the two WIA programs, additional losses due to failure of matching were very small, and losses in the TAA sample were modest. We discuss results of the within-firm matching below.

[10] The standardized differences for a variable is the difference in the mean for the two samples divided by a measure of the standard deviation, calculated as sd= SQRT(0.5 v1 + 0.5 v2), where v1 and v2 are the variances for the training program sample and the matched comparison group, respectively.

[11] In the case of within-firm matching, where the sample sizes were smaller, the largest standardized differences were never greater than 0.05.

The estimate of the program's impact on subsequent earnings for a given gender and quarter of entry (the average effect of the treatment on the treated) is the difference in earnings for the participants in the training program and the weighted comparison sample for that quarter and gender. This approach produced 12 estimates for each gender and training program for each subsequent quarter of earnings (up to 16). In presenting impacts, we combine the 12 quarters of entry to make comparisons across four periods: the last six month of 2007, prior to the onset of the recession; the first six months of 2008, while the recession was quite mild; the period July 2008-June 2009, the height of the financial crisis and subsequent sharp recession; and July 2009-June 2010, during the beginning phases of the slow recovery.

In order for our estimates of impact to be unbiased, it is necessary that the matched comparison group not differ in unmeasured ways from program participants. We have controlled for earnings in each of the 12 quarters prior to program entry (among other control variables), so our methods assure that differences between the participant and comparison group earnings during this three-year period will not be substantial. To examine whether unmeasured factors influencing earnings differ for the treatment and the comparison group, we examined earnings in quarters 13-16 previous to program entry, that is, in the year prior to the quarters of pre-program earnings for which we control in our models. If participants and the comparison cases differ in terms of stable characteristics that influence earnings and are not fully captured by the measured variables in our specification, we would expect to see these reflected in earnings differences for quarters 13-16 prior to program entry. In effect, we undertake "impact estimation" on these prior earnings quarters as a kind of specification test of our model, with the expectation that we will find no statistically significant differences.

Results

WIA Adult program findings

Figures 5-8 present the earnings for male WIA Adult program participants in the matched sample following their entry into the respective program. Also presented on each graph are earnings for the matched (ES) comparison group, as well as the difference in earnings between those receiving training and the comparison group, i.e., the estimate of the program's impact, along with the 0.05 (two tailed) confidence intervals based on bootstrap standard errors.[12] As indicated above, we separately consider participants entering the program in July-December 2007, January-June 2008, PY2008, and PY2009. The horizontal axis identifies the quarter relative to the quarter of entry.

For males entering in July-December 2007 (Figure 5), both participant and comparison cases had quarterly earnings in the range $2000-$3000 during the full four-year period, and we see little trend. Although participant earnings exceeded those of the comparison group by over $200 in quarters 1-5, and again by over $100 in quarters 12-14, such differences were quite modest, and the confidence intervals include zero for most estimates. A similar conclusion applies for those entering in the first half of 2008 (Figure 6). Overall, we conclude that there may be modest benefits (i.e., small training impacts) for males entering training before the recession. Comparable statistics for PY2008 and PY2009, presented in Figures 7 and 8, yield rather different patterns. First, we see that in both years, there is substantial growth in earnings for both participants and comparison group members. We also see that comparison group members' earnings are generally higher than participants', implying negative impact estimates, although the differences decline over time.

[12] These standard errors are based on bootstrap methods that resample the population of individuals. We use 20 replications.

Figure 9 presents the impact estimates for males for these four periods on one graph. The differences in impact for the initial quarters following entry are substantial by year of entry, and these differences are easily statistically significant, implying that the cost of participation (in terms of foregone earnings) is clearly much greater for those entering during PY2008 and PY2009 than in the prior year. One is certainly unlikely to infer that the benefits of training were greater after the onset of the recession.

Figure 10 provides estimates of program impact by period of entry for female participants in the WIA Adult program, analogous to Figure 9. Here we see that, for those entering in July-December 2007, the initial increment for those undertaking training was in the range of $100-$500 per quarter, increasing to over $500 after quarter 5. For those entering in the first half of 2008, the pattern was similar, although the earnings increment was somewhat greater, generally over $600 in quarters 5-12. In contrast, for PY2008 and PY2009, after the onset of the most serious phase of the recession, earnings for program participants were somewhat below those in the comparison group. The *decrement* was close to $500 in quarters 1 and 2 for those entering in PY2008, but impact estimates improved in later quarters, turning positive after quarter 8. An almost identical pattern applies to females entering the program in PY2009. Again, we do not find evidence of greater training impacts during the recession.

WIA Dislocated Worker and Trade Adjustment Assistance program findings

Figures 11 and 12 provide comparable tabulations for participants in the WIA Dislocated Worker program (who have been displaced from jobs). For men, looking across all four periods, we see that impact estimates for those in the WIA DW program were negative initially, although growth did differ by period of entry. For those entering in July-December 2007, prior to the start of the recession, estimates remain negative for the full four years following entry, although the

confidence intervals for estimates in quarters 15 and 16 include numbers very close to zero. In contrast, for those entering the program in the first half of 2008 and those entering during the PY2008, estimates are close to zero (and not statistically significant) by quarter 12, and remain at that level for the last year. Finally, for those entering in PY2009, we see that estimated losses are somewhat smaller, and that positive, statistically significant impacts are found after quarter 6, reaching $400 by quarter 12.

For female dislocated workers, Figure 12 provides a slightly different story. The earnings losses associated with program participation are somewhat larger for woman, and they are greatest for those entering the program in PY2008, in the midst of the worst of the recession (i.e., approaching -$1600 in quarter 2). The impact estimates are less negative for those entering in the period July-December 2007 and in the last period, PY2009, with estimates near zero by quarter 10. However, for those entering in other periods, impact estimates are not significantly different from zero in the final quarters.

Figures 13 and 14 present comparable analyses for the TAA program. The basic patterns for both males and females are similar to those for the WIA DW program, insofar as participants appear to earn substantially less through most of the follow-up period than do those in the matched comparison sample. However, earnings losses in the initial quarters are much greater for TAA participants, with most impact estimates for quarters 1-6 between -$1,500 and -3,000. In the last quarters of our period, estimates are closer to zero, implying that participants earn around $500 less per quarter than they would if they had not participated, although many are not statistically significantly different from zero.

In summary, when comparing impact estimates by time of program entry for the WIA DW and TAA programs, results are mixed. Impact estimates for those entering prior to the

recession (in the last half of 2007) are somewhat smaller (more negative) than estimates for persons entering training after the start of the recession, both for men and women. But there is no palpable support for the view that training is more beneficial during the recession, given that impacts do not turn positive even at 16 quarters.

Specification tests

Table 3 provides estimate of the difference in earnings between the participants and the matched comparison group in quarters 13-16 prior to program entry, our specification test. As noted above, if these estimates are statistically significant, it suggests that participants have stable unmeasured differences (not captured by our control variables) that influence earnings from the matched comparison group, implying that our impact estimates may well be biased.

For the WIA Adult program, of the estimated differences in earnings for the prior quarters 13-16, only one of 32 is statistically significant, supporting the view that the comparison group is comparable in terms of stable factors influencing labor market success. In contrast, 12 of the analogous estimates for the WIA Dislocated Worker programs are positive and statistically significant, whereas two are negative and statistically significant. Positive estimates suggest that stable characteristics may favor both males and females entering the program in the initial period (July-December 2007). Similarly, for males in PY2008 and females in PY2009, positive impacts imply participants have stable characteristics leading to greater labor market success than comparison group members. In contrast, for women entering in the January-June 2008 period, since estimates are negative, this suggests that participants in the training program have lower earnings potential than those in the matched comparison group. The lower panel of Table 3 presents estimates for the TAA program, indicating positive and often statistically significant

estimates of prior earnings (11 of 32 estimates positive and statistically significant), generally consistent with results for the WIA DW program.

Insofar as positive impacts estimated using prior earnings suggest that participants in the WIA DW and TAA programs have more favorable stable characteristics that influence earnings than the matched comparison group, they suggest that impact estimates reported in Figures 11-14 likely overstate the program's impact. Yet, these specification tests do not alter our basic conclusions; that is, the pattern of estimates in Table 3 does not suggest that such a bias is more severe for those entering programs during the recession, and so it does not appear that the true impact of participation is larger for this group.

Alternative Comparison Group: UI Claimants and Recipients

The comparison group used above consists of individual who obtained job search assistance through the Employment Services program under Wagner-Peyser legislation. We next consider an alternative comparison group, the population of individuals who have filed Unemployment Insurance claims or received UI benefits. This comparison group is of interest for two reasons. In some prior analyses (Hollenbeck et al., 2005; Heinrich et al., 2013), data on UI claimants or recipients has been used as the comparison group, often because ES data were not available. In addition, an argument can be made that the UI data provide a preferable comparison group for the WIA DW and TAA programs, since a very large share of these participants have claimed or are receiving UI benefits during the quarter they enter the program.

In the matching analysis for the WIA DW and TAA programs using the UI comparison group, we control for information about UI receipt during the quarter of program entry, as well as personal characteristics and measures based on prior employment as indicated above. For those receiving UI benefits in the current quarter, controls includes a count of the number of

consecutive months an individual had been receiving UI benefits (going back up to three years), and whether a claim had been filed or UI benefits had been received during the quarter of entry. Since the comparison group is defined as those receiving benefits or filing a claim during this quarter, these controls essentially limit the sample to program participants who have these contacts with the UI system. For the WIA Adult program, controlling for these measures of UI participation in the quarter of entry omits more than half of the participant cases, and so we therefore do not include these controls.[13]

Figures 15 and 16 provide impact estimates for the WIA Adult program using the UI comparison group. Here we see more favorable program impact estimates than those based on the ES comparison group. For those entering the program in the first two periods, prior to the onset of the worse part of the recession, impact estimates are positive, mostly in the $200-$500 range, although many are not statistically significant. For PY2008 and PY2009, the impact estimate are negative initially, but become positive. Generally, however, these impact estimates are either not statistically significant or only marginally so. For women, although the patterns over time are similar to those for men, impact estimates are larger and statistically significant, exceeding $1000 for the two early entry groups. Despite differences between the ES and UI comparison groups, our basic conclusion that the program's impact is not greater for those entering during the recession is unchanged. For both men and women, impact estimates are generally lower for those entering training during the recession, with differences most notable during the initial year or two after entry.

[13] Six percent of WIA DW participants were discarded due to difficulties finding matching comparison cases (see Table 2). Although nearly a quarter of TAA participants were omitted because of failure to find matches, the primary reason for these omissions was not due to the likelihood of UI participation. If we apply that same standard for WIA Adult participants, 60 percent of cases are omitted due to failure to match, reflecting the fact that UI involvement is more limited for that group.

Impact estimates for the WIA DW program, based on the UI comparison group are provided in Figures 17 and 18. For both males and females, estimates follow the same patterns as those based on the ES comparison group. Negative impact estimates in the early quarters become less negative in later quarters, although the estimates in this analysis are somewhat more likely to turn positive in the final quarters.

When we examine how estimates shift by period of entry, we see that for women (Figure 18), the initial costs of program participation are greater for those entering during the height of the recession (in PY 2008). Alternatively, for males (Figure 17), the returns in later quarters for those entering training prior to onset of the recession are below those entering during the recession. Yet for both men and women, the returns for those entering the program in PY2009 (i.e., during the period of recovery), are substantially greater (by quarter following entry) than those entering in other periods. We conclude that although estimates based on the UI comparison group suggest less negative (or somewhat more positive) impacts of the WIA DW program than those based on the ES comparison group, they are again no more supportive of the view that the training during the recession has better returns than that training at other times.

Figures 19 and 20 provide estimates for impact of participation in the TAA program based on the UI comparison group. The most notable difference between these results and those base on the ES comparison group (Figures 13 and 14) is that the negative impact estimates are appreciably more dramatic here. We see that, for both genders, negative quarterly impacts in some quarters reach $4000 in absolute value, in contrast to values no greater than $3000 in the prior analyses. Estimates for later quarters are quite similar, however. Comparisons by quarter

of entry are similar to those reported earlier, with those entering in the first period (prior to the recession) doing less well than those entering during the recession.[14]

Within-Firm Analysis

Although the methods used above have matched participants with nonparticipants on the basis of personal characteristics and three years of earnings and employment information, it is possible that participants and the matched comparison sample may differ in unmeasured ways. Our specification test does find statistically significant differences in prior earnings in some cases, suggesting that there may be stable differences not captured by our control variables. It is also possible that the experience of being laid off may differ for participants (vs. the matched comparison group) in ways not captured by our controls. Fortunately, both the WIA DW and TAA programs have participants in a relatively small number of large firms, and it is possible to find individuals (participants and comparison group members) with similar layoff experiences in those same firms. We report on within-firm analysis in this section undertaken for the WIA DW and TAA programs. The details of how we matched laid-off workers within firms are provided in the Appendix.

Table 2 shows that in the within-firm analyses, we lose 80 percent of the WIA DW cases. Although a substantial portion of the loss is due to failure to experience a layoff as we have defined it, more important is that program participants are widely dispersed among firms, so that when we limit analysis to the firms making the largest number of layoffs, we lose many cases. Interestingly, during the quarters of greatest economic distress, the number of firms with identifiable layoffs increases dramatically, reflecting the fact that economic distress was not

[14] Results of the same specification tests reported earlier, which examine earnings in quarters 13-16 before program entry, are available from the authors. Only for WIA DW women did we find a number of statistically significant positive estimates, suggesting that participants may have had stable traits associated with greater labor market success than the matched comparison group.

limited to a small number of firms. In contrast, in the TAA program, participation is much more concentrated in a small number of firms—not surprising given the character of the program—and, as a result, less than 40 percent of the cases are lost in the within-firm analysis.

Figures 21-24 provide the within-firm results using the ES comparison sample, and Figures 25-28 present results using the UI comparison group. We first look at these results for WIA DW participants (shown in Figures 21-22 and Figures 25-26), keeping in mind that these analyses apply to only a subset of participants considered in the prior analyses, those facing identifiable layoffs from large firms. The most important difference between these results and those presented previously is that the estimated quarterly earnings loss in the quarters immediately after earnings entry are smaller, with impact estimates seldom less than −$500. However, the basic pattern of results is quite similar, with growth in later quarters. Impact estimates 18 months after entry (quarters 11-16) are not much above zero in the analyses that use the ES comparison group, but they approach $500 in the analyses using the UI group. However, in essentially all cases, the confidence intervals for all estimates include zero. There are no obvious systematic differences by period of entry.

The within-firm results for TAA (Figures 23-24 and 27-28) closely parallel the TAA estimates presented earlier, very likely reflecting the fact the cases in this analysis are the largely same. As before, the estimates are strongly negative, and then approach zero and are sometimes positive in the last year of the data. The negative impact estimates for the first two years after program entry are statistically significant, but no positive estimates are significant. Again, there are essentially no systematic patterns in impact estimates by period of entry.[15]

[15] Results of the specification tests using prior earnings for the within-firm analyses (available from the authors) show that only one of the 128 differences is statistically significant, suggesting no concerns about stable unmeasured differences between the groups compared in these analyses.

Conclusion

Overall, these findings suggest that there is no evidence that the value of training increases in the face of serious recession. It is plausible that, similar to the findings of Raaum et al. (2002), training program participants faced limited job prospects when entering the labor market after training, given the remarkably slow pace of hiring since the Great Recession officially ended, which tempered their gains from training.

Undertaking training during a recessionary period when employment prospects are poorer and the opportunity costs of engaging in training are lower makes intuitive sense, and this is reflected in sharp increases in the number of individuals participating in training during the recent deep recession. However, as prior work has suggested, the timing of subsequent labor market entry (in terms of the business cycle) may determine whether improving one's skills yields returns in the form of higher earnings. If the impacts of training are greater with program entry in a recessionary period, policymakers could encourage and support higher take up of training during economic downturns to mitigate negative effects (e.g., depreciation of skills) and pave a pathway to stronger future growth (with a better trained workforce). Indeed, it was the intent of the ARRA fund injection into WIA to help a greater number of individuals increase their skill levels and improve their chances of regaining employment.

Taking advantage of the steep decline in employment in Missouri in late 2008 and early 2009 and the availability of data over a broader period (2007-2010), we investigated the relationship of training program impacts to macroeconomic changes. Our preliminary findings do not support the view that individual gains from training are larger when participants enter training during a recession. A plausible interpretation is that the smaller, negative lock-in effects do not outweigh the disadvantage or earnings penalty encountered when attempting to re-enter

employment in a slow recovery period. National labor market data suggest that the economic recovery stuttered in early 2010 and that employment growth for the most part was weak thereafter (Heinrich and Houseman, 2013).

In addition, there is ongoing debate about the extent to which recent labor market challenges faced by workers and those looking for work are *cyclical vs. structural* (Autor, 2010; Farber, 2011). Considerable research has documented the diminished importance of the manufacturing sector, which has long been a source of high-wage jobs, and the roles of globalization and skill-biased technical change that have moderated employment and wage-growth for less skilled workers (Damme, 2011). If public employment and training programs are not helping individuals to acquire skills in demand in the labor market, the opportunity costs of training (even if lower) will be unlikely to be offset by higher future earnings. Holzer (2013: 6) identifies "a growing complementarity over time between personal skills and firm wage premia" and suggests that U.S. competitiveness in the global labor market is being limited by its public policies that have been ineffectual in increasing human capital and preparing our workforce for available jobs. At the same time, the degree to which structural vs. cyclical factors are playing out in an individual's employment and earnings prospects could also vary from one local labor market to another, as recent research suggests that local labor markets may be subject to differential trade shocks that depend on initial patterns of industry specialization (Autor, Dorn and Hanson, 2013).

We also recognize that the generalizability of our results may be limited by our focus on a single state (Missouri) and an unusually severe recessionary period with a long, slow recovery. There is considerable variation in the implementation of training programs across U.S. states, and correspondingly, in regional and local labor market growth and rates of recovery following

the onset of the recession. Ideally, we would like to replicate these analyses in different states and/or regions and in other time periods (pre-, during and post-recession) to assess to whether our finding that the impacts of undertaking training during a recession are not greater (than entering training at other times) holds more generally.

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Appendix: Details on Approach to Matching Workers within Firms

In order to limit consideration to those workers with attachments to particular firms who faced layoffs, we omitted cases where a layoff could not be identified. A layoff from a particular firm is assumed to occur in the entry quarter when more than 80 percent of earnings in the prior two quarters comes from one firm, and when no earnings from that firm are received in the two quarters subsequent to program entry. In addition to keeping those cases with identifiable layoffs based on this criterion in the quarter of entry, we kept any case with an identifiable layoff in either of the prior two quarters. (Previous work suggests that it is not unusual for individuals to enter the TAA program many months following their layoffs.) We applied this selection to the program participant cases and the comparison cases for the same quarter.

Focusing on individuals entering the program in a given quarter (or in the cases of the TAA, a two-quarter period), we then identified the particular firms from which these individuals were laid off. If there were more than 30 such firms for this entry cohort, we omitted participants from all but those 30 firms with the largest share. We then considered the comparison cases for that same quarter, and we omitted any case that did not have a layoff in those same firms. Hence, before beginning the matching, the participants and comparison samples were limited to individuals facing layoffs in the same set of firms.

We then constructed two variables for each firm in the quarter (for up to 30 firms), one the total earnings received from that firm by the individual in quarters 1-4 prior to program entry, and a second the total earnings received from that firm by the individual in quarters 5-8 prior to program entry. We the ran the logit in the combined sample of participants and comparison cases, controlling for up to 60 firm-specific variables, a set of dummies identifying when the layoff occurred, as well as all of the measures controlled in the prior analyses. If the matching

worked perfectly, then participants would be matched with comparison cases with the same average level of earnings in the same firms in the prior two years, having experienced a layoff at the same point in time, having the same personal characteristics and prior labor market measures. We also looked at the proportion of cases in each of the firms in the treated and matched comparison cases for each quarter, and there was generally good agreement.

Table 1. WIA Adult, WIA DW and TAA Programs: Caseload Characteristics by Quarter of Program Entry

			Participant Characteristics				Services Received	
	Quarter of Entry	N	Male	Age (Mean)	African American	Education (Mean)	Intensive Services (No Training)	Training
WIA Adult Program								
Program Year 2007	2007:3	1412	36%	35.2	42%	12.6	27.0%	49.9%
	2007:4	939	42%	36.9	45%	12.5	32.0%	36.2%
	2008:1	887	40%	37.1	47%	12.7	33.4%	37.9%
	2008:2	710	40%	36.9	46%	12.7	43.4%	33.7%
Program Year 2008	2008:3	1356	37%	35.6	36%	12.7	34.8%	50.7%
	2008:4	1327	46%	37.6	42%	12.7	39.3%	46.2%
	2009:1	1368	48%	39.1	36%	12.8	37.8%	45.9%
	2009:2	1485	46%	38.7	32%	12.8	32.1%	56.5%
Program Year 2009	2009:3	2174	47%	37.0	30%	12.9	21.6%	69.0%
	2009:4	1777	50%	37.5	38%	12.7	31.3%	54.9%
	2010:1	1948	49%	38.5	44%	12.7	39.3%	46.1%
	2010:2	1496	52%	39.0	42%	12.7	31.8%	45.9%
WIA Dislocated Worker Program								
Program Year 2007	2007:3	931	37%	44.1	16%	12.8	37.0%	49.6%
	2007:4	787	48%	44.3	19%	12.8	41.6%	38.3%
	2008:1	933	53%	43.8	30%	12.9	48.5%	37.5%
	2008:2	540	36%	43.9	29%	13.1	48.5%	38.5%
Program Year 2008	2008:3	1156	45%	43.4	26%	13.1	43.8%	45.8%
	2008:4	1469	58%	43.3	25%	13.1	43.8%	48.9%
	2009:1	1757	52%	43.5	22%	13.3	39.3%	52.8%
	2009:2	1928	51%	43.9	21%	13.4	29.6%	54.6%
Program Year 2009	2009:3	2458	56%	43.0	18%	13.2	23.4%	68.8%
	2009:4	1875	55%	43.9	26%	13.3	40.8%	49.2%
	2010:1	1545	55%	43.8	30%	13.4	36.3%	52.2%
	2010:2	1335	52%	44.2	24%	13.3	34.3%	51.1%
Trade Adjustment Assistance Program								
							Remedial and ESL Classes	Occupational Training and OJT
Program Year 2007	2007:3	289	44%	46.6	4%	12.1	19.4%	55.0%
	2007:4	220	51%	47.6	7%	12.2	17.3%	44.6%
	2008:1	383	61%	45.1	20%	12.3	7.3%	54.3%
	2008:2	488	50%	46.6	16%	12.3	5.9%	55.9%
Program Year 2008	2008:3	293	53%	44.2	21%	12.4	4.8%	59.7%
	2008:4	968	69%	44.5	16%	12.4	3.6%	57.8%
	2009:1	1437	63%	46.0	16%	12.3	6.7%	41.1%
	2009:2	647	55%	45.5	12%	12.3	14.7%	46.5%
Program Year 2009	2009:3	675	63%	46.8	9%	12.3	10.1%	37.6%
	2009:4	472	61%	46.5	15%	12.3	5.7%	38.1%
	2010:1	220	46%	47.4	17%	12.3	8.6%	41.4%
	2010:2	238	43%	48.7	15%	12.5	3.4%	45.0%

Table 2. Analysis Sample Size: Omissions and Matching Statistics

Main Analysis	WIA Adults		WIA Dislocated Workers		TAA	
Cases in original file	16,879		16,714		6,330	
Cases omitted because of missing data on gender		1		0		0
Cases omitted because age was under 18 or 70 or older at entry		174		42		24
Cases omitted because of incomplete prior earnings information		765		287		12
Cases omitted because severance pay was received		437		1,530		1,515
Cases omitted due to earnings received from Firm A		0		839		1,300
Case available for matching/total percent omitted	15,502	8%	14,016	16%	3,479	45%
Matching with WP Comparison Group						
Case that could not be matched		59		70		565
Cases matched in WP main analysis/percent not matched	15,443	0%	13,946	0%	2,914	16%
Matching with UI Comparson Group controlling w/in qtr UI						
Cases that could not be matched		2,237		884		815
Cases matched in UI main analysis/percent not matched	13,265	14%	13,132	6%	2,664	23%
Within-Firm Matching						
Cases available for matching in main analysis			14,016		3,479	
Cases omitted due to not experiencing observed layoff				4,191		842
Cases omitted due to limiting analyses to firms with most layoffs in quarter				7,034		495
Cases available for within-firm matching/additional percent omitted			2,791	80%	2,142	38%
Matching with WP Comparison Group						
Cases that could not be matched				120		47
Cases matched in within-firm analyses/percent not matched			2,560	4%	2,095	2%
Matching with UI Comparison Group						
Cases that could not be matched				355		285
Cases matched in within-firm analyses/percent not matched			2,436	13%	1,857	13%

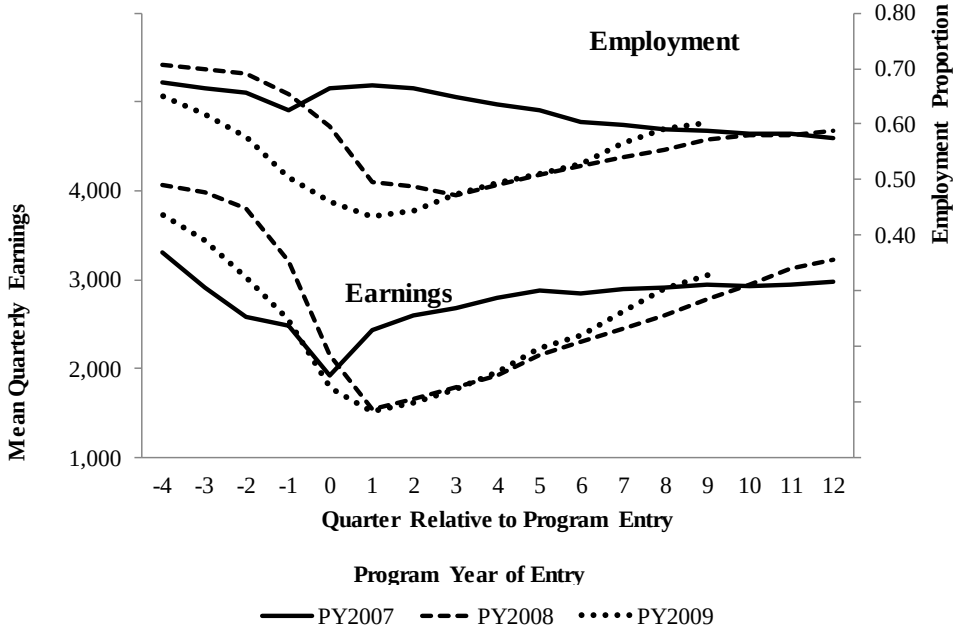
Table 3. Average Earnings Difference Between Participants and Wagner-Peyser Matched Comparison Group, Year Prior to Earnings Match

	Men				Women			
	July - Dec.	Jan. - June			July - Dec.	Jan. - June		
WIA Adult	2007	2008	PY2008	PY2009	2007	2008	PY2008	PY2009
Prior Quarter 16	27	127	107	-171	-48	-34	-26	47
Prior Quarter 15	38	171	81	-68	-2	-20	-32	74
Prior Quarter 14	99	130	55	-119	7	-53	-31	92 *
Prior Quarter 13	-29	-7	45	-23	3	-11	27	65
WIA DW								
Prior Quarter 16	323 *	13	191 *	-15	152 *	-115	153	169 *
Prior Quarter 15	324 *	18	279 *	104	155 *	-228 *	92	227 *
Prior Quarter 14	164	146	181 *	-82	91	-249 *	98	73
Prior Quarter 13	84	-3	241 *	-41	228 *	70	55	144 *
TAA								
Prior Quarter 16	203	397 *	296	310	328 *	407 *	193	459
Prior Quarter 15	591 *	418 *	436	558	560 *	19	340	597
Prior Quarter 14	452 *	256 *	550	494	182	63	402	340
Prior Quarter 13	404 *	307	321	274	438 *	336 *	376	333

*Statistically significant at the 0.05 level.

Figure 1. Missouri Statewide Monthly Unemployment Rate: Seasonally Adjusted

Figure 2. WIA Adult Program: Earnings and Employment by Quarter Relative to Quarter of Entry by Program Year



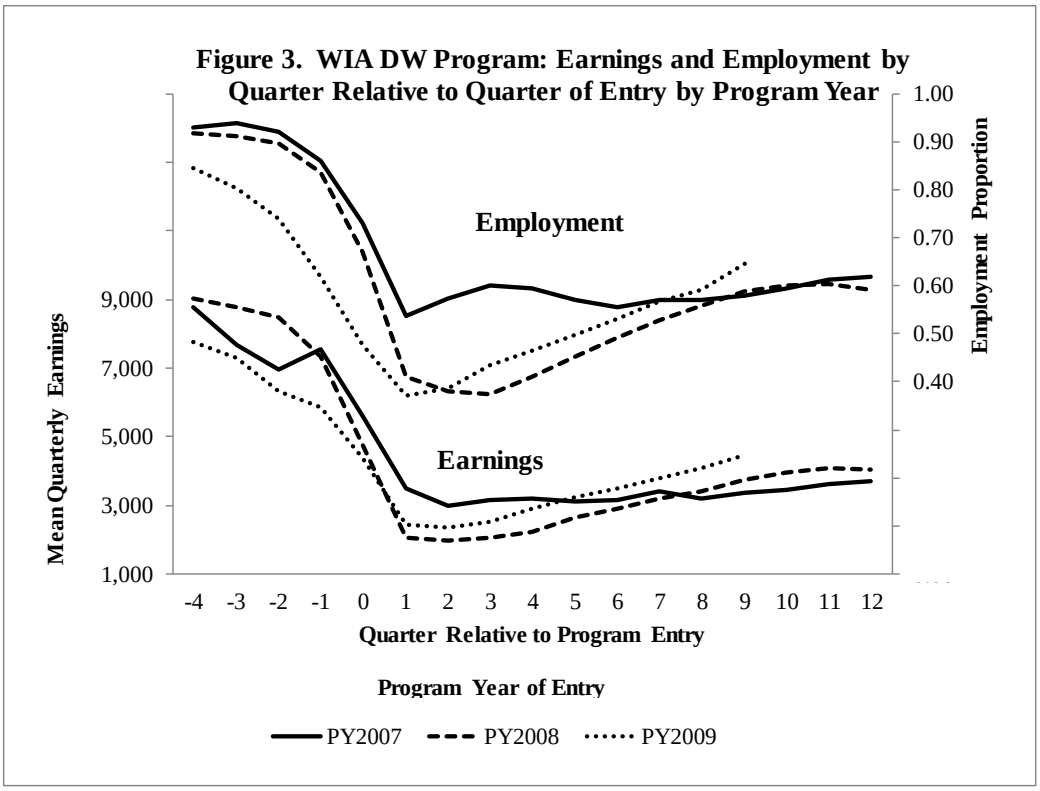


Figure 3. WIA DW Program: Earnings and Employment by Quarter Relative to Quarter of Entry by Program Year
Employment
Earnings
Mean Quarterly Earnings
Employment Proportion
1,000
3,000
5,000
7,000
9,000
0.40
0.50
0.60
0.70
0.80
0.90
1.00
-4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12
Quarter Relative to Program Entry
Program Year of Entry
PY2007 PY2008 PY2009

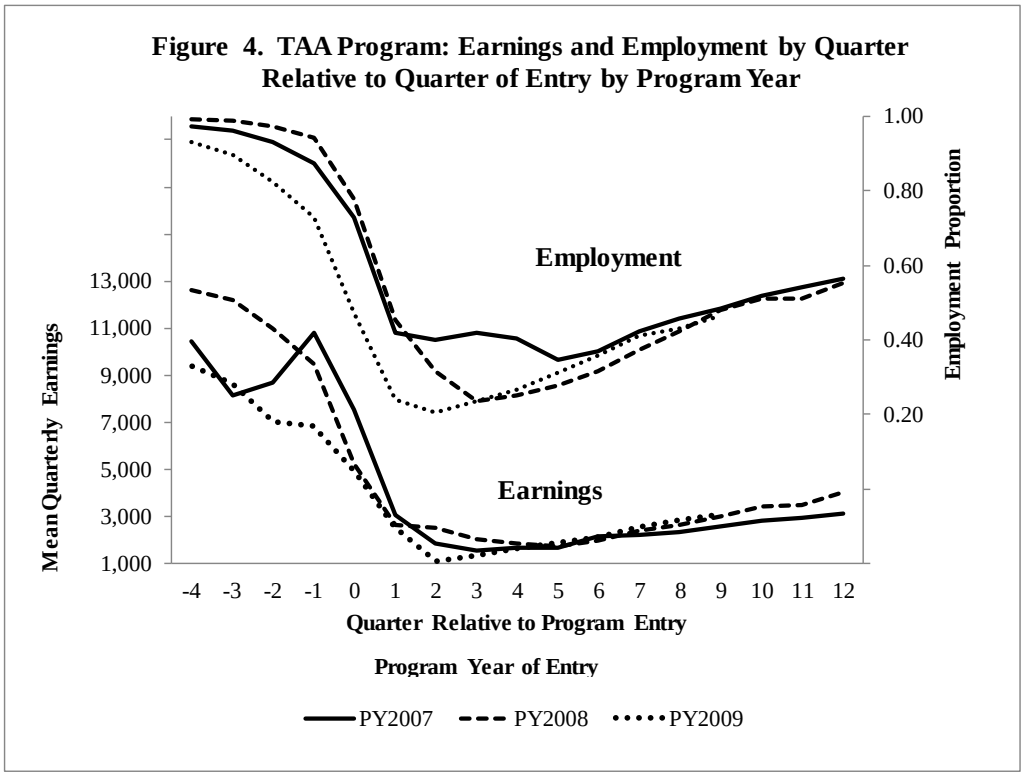


Figure 4. TAA Program: Earnings and Employment by Quarter Relative to Quarter of Entry by Program Year
Employment
Earnings
Mean Quarterly Earnings
Employment Proportion
1,000
3,000
5,000
7,000
9,000
11,000
13,000
0.20
0.40
0.60
0.80
1.00
-4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12
Quarter Relative to Program Entry
Program Year of Entry
PY2007 PY2008 PY2009

Figure 5. WIA Adult Males, Participant and WP Comparison Group Earnings: Entrants July-December 2007

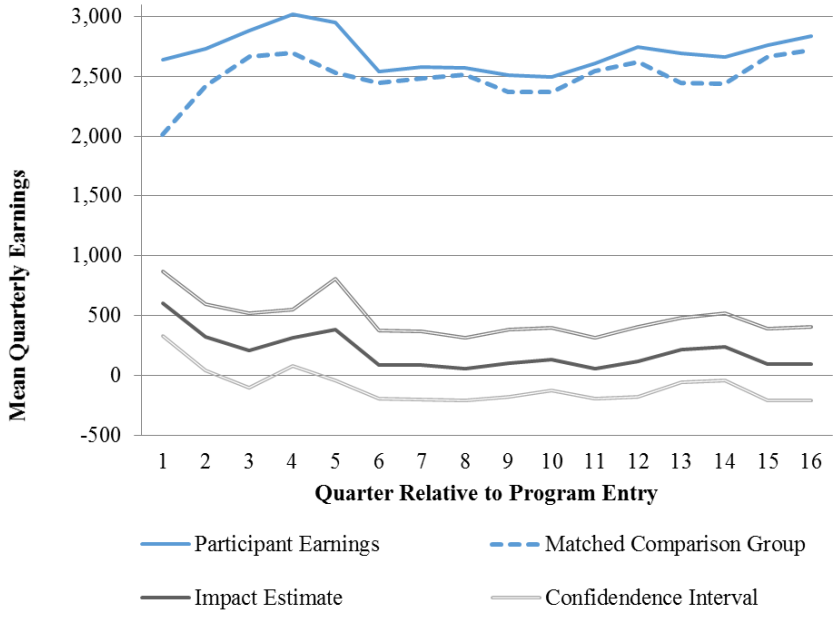


Figure 6. WIA Adult Males, Participant and WP Comparison Group Earnings: Entrants January-June 2008

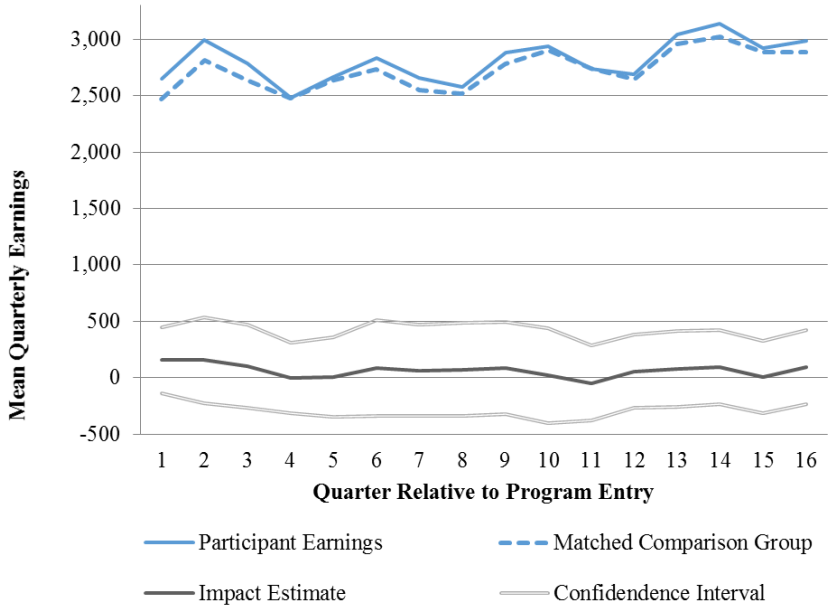


Figure 7. WIA Adult Males, Participant and WP Comparison Group Earnings: Entrants PY2008

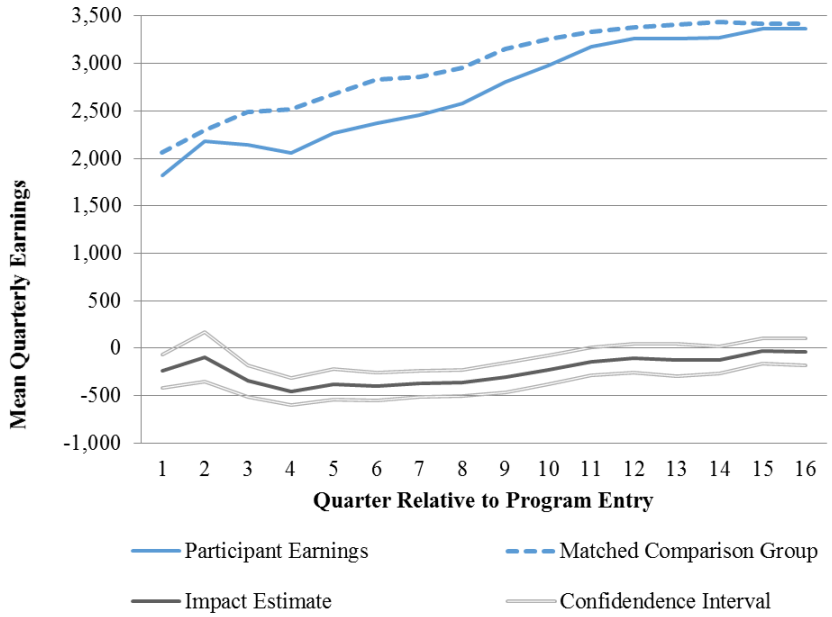


Figure 8. WIA Adult Males, Participant and WP Comparison Group Earnings: Entrants PY2009

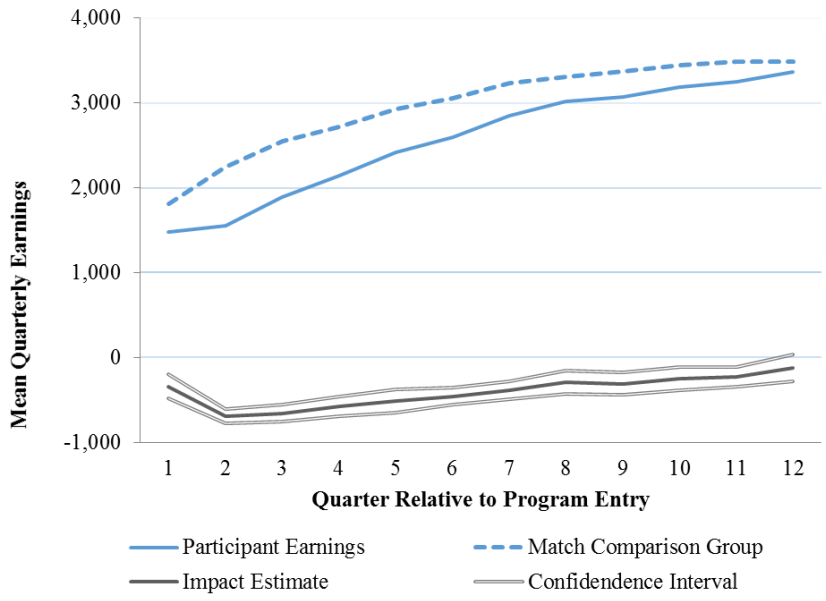
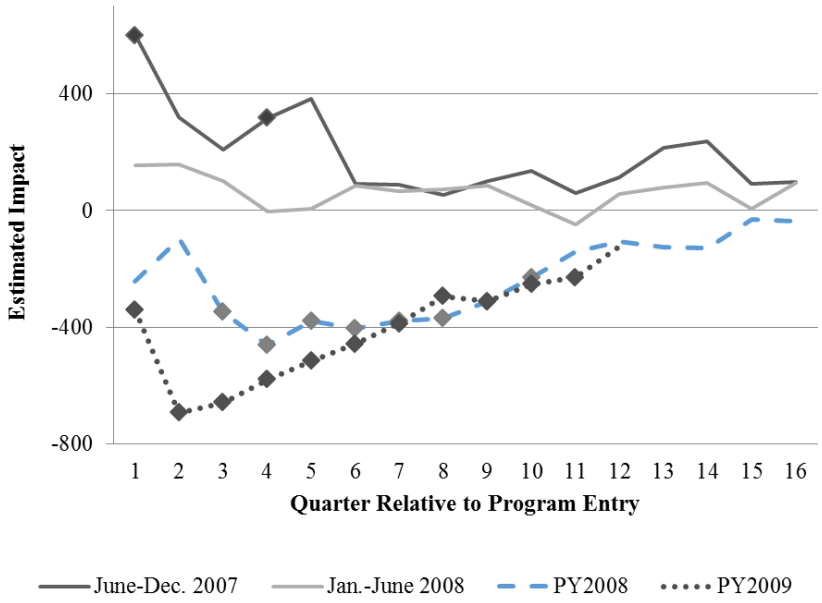
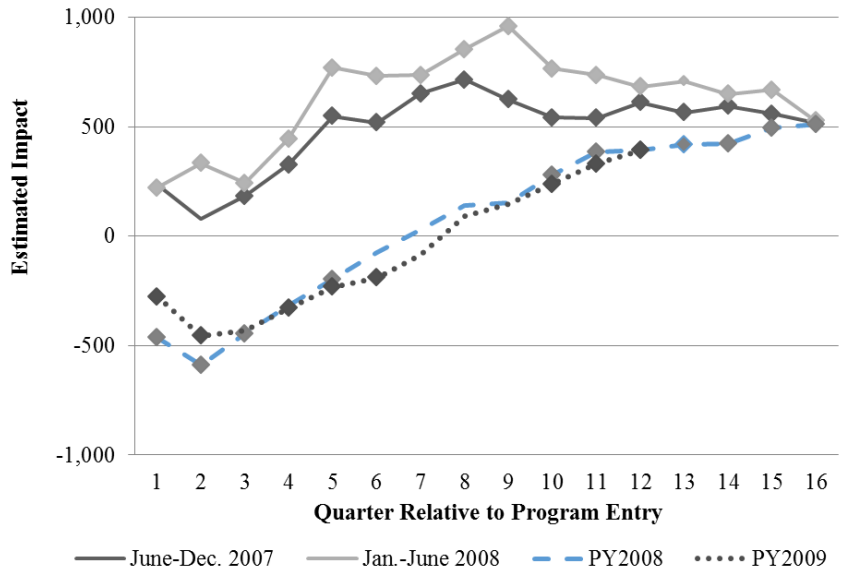


Figure 9. WIA Adult Males: Program Impact Estimates, ES Comparison Group



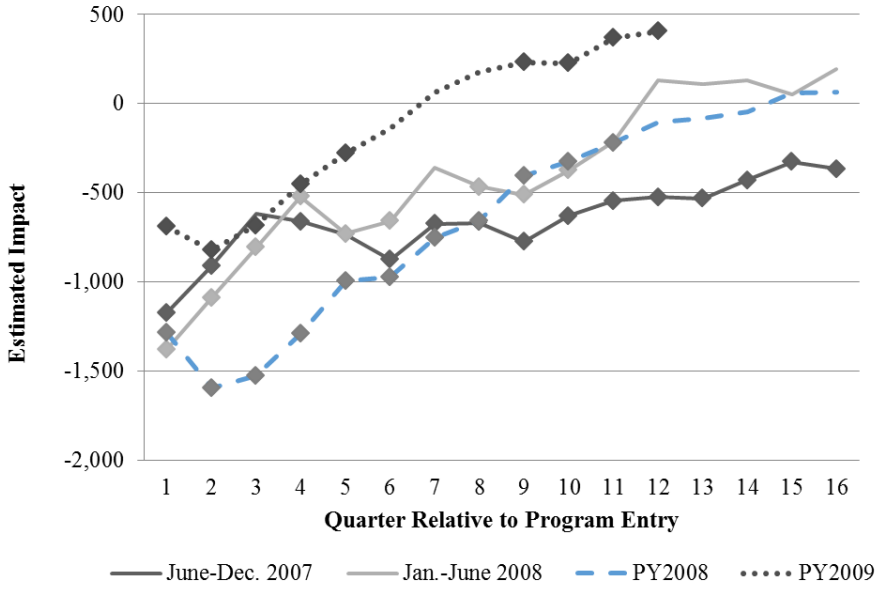
Marker identifies statistical significance at the 0.05 level.

Figure 10. WIA Adult Females: Program Impact Estimates, WP Comparison Group



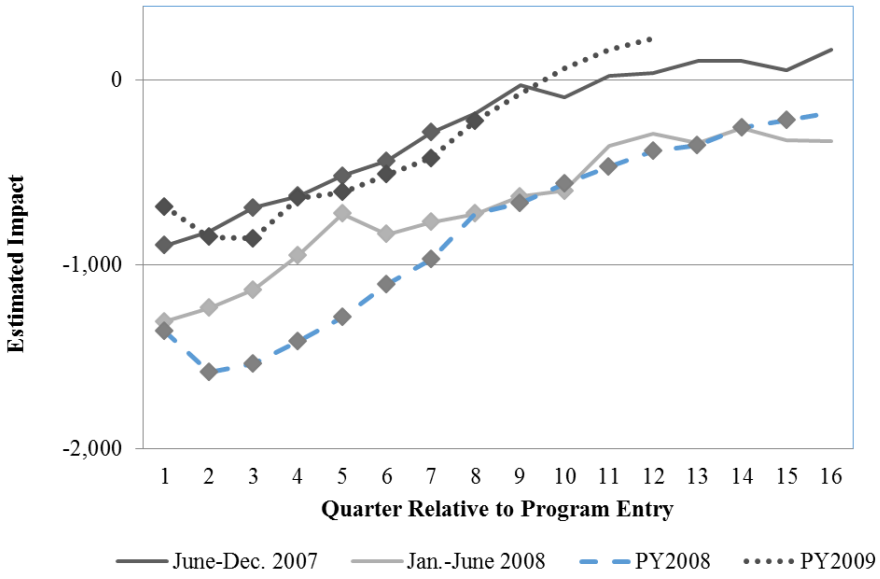
Marker identifies statistical significance at the 0.05 level.

Figure 11. WIA DW Males: Program Impact Estimates, ES Comparison Group



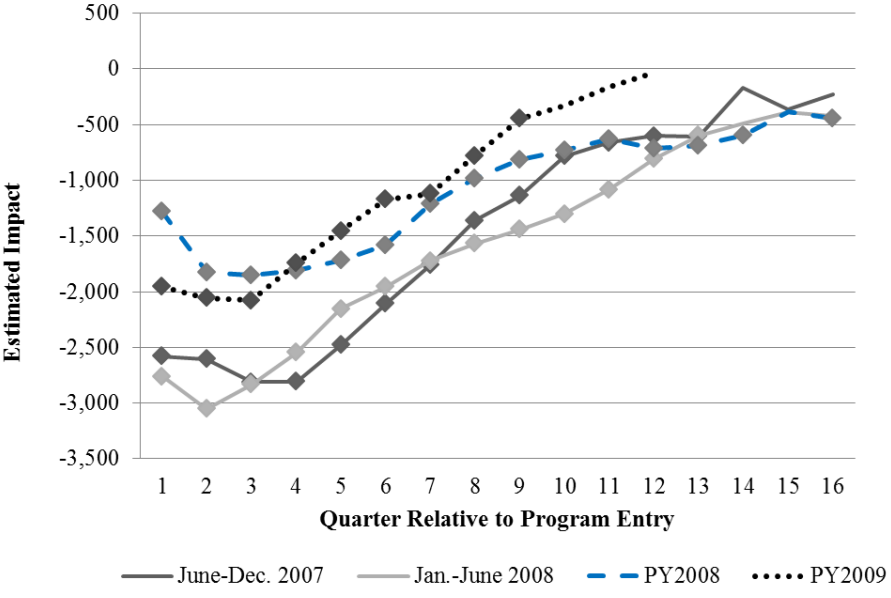
Marker identifies statistical significance at the 0.05 level.

Figure 12. WIA DW Females: Program Impact Estimates, ES Comparison Group



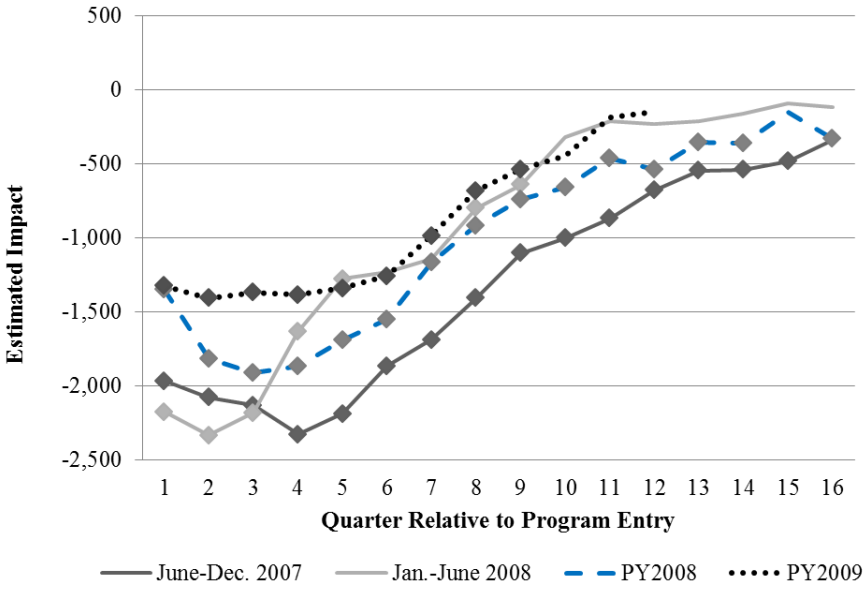
Marker identifies statistical significance at the 0.05 level.

Figure 13. TAA Males: Program Impact Estimates, ES Comparison Group



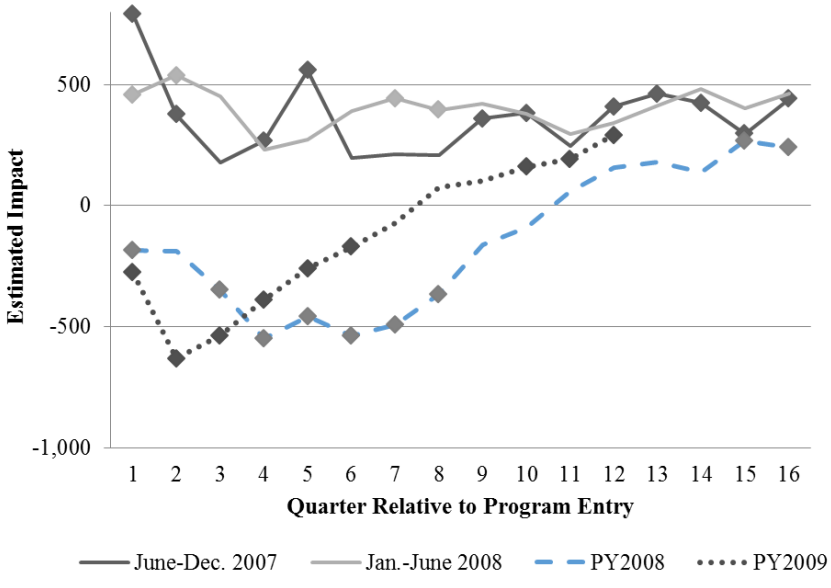
Marker identifies statistical significance at the 0.05 level.

Figure 14. TAA Females: Program Impact Estimates, ES Comparison Group



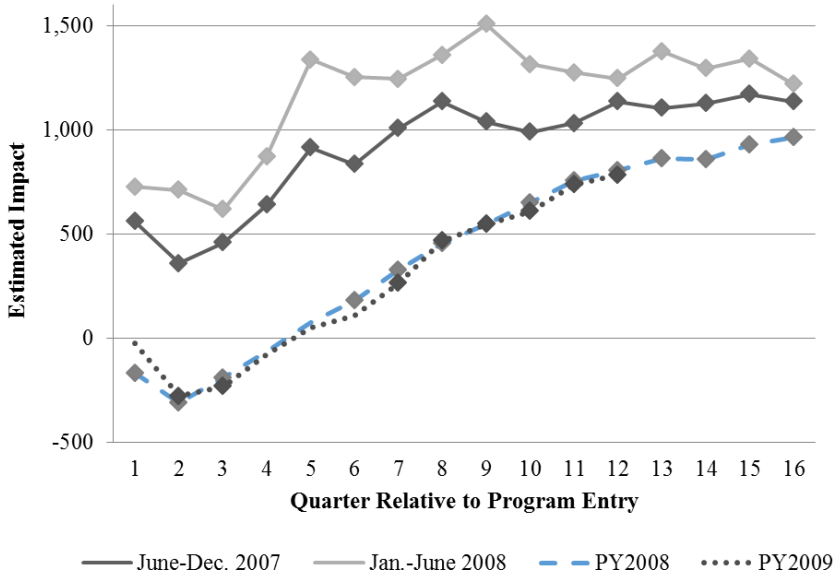
Marker identifies statistical significance at the 0.05 level.

Figure 15. WIA Adult Males: Program Impact Estimates, UI Comparison Group



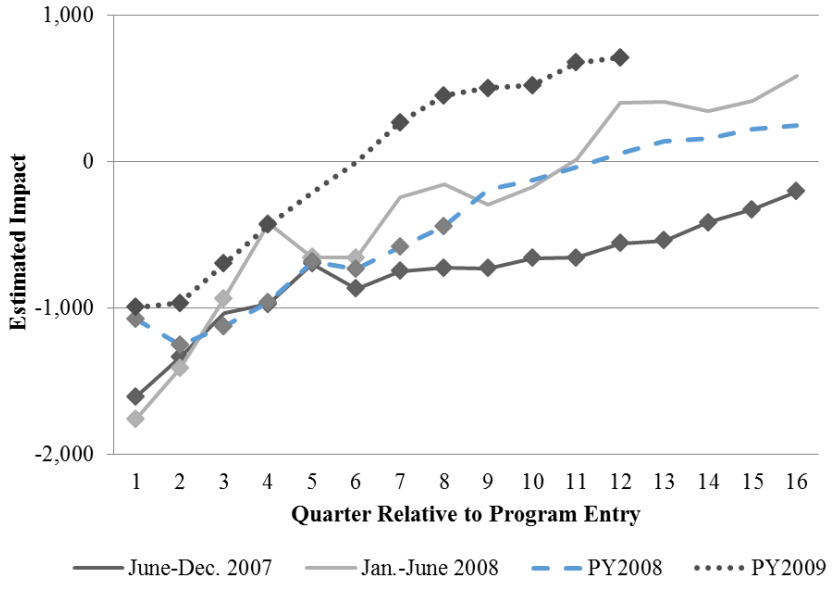
Marker identifies statistical significance at the 0.05 level.

Figure 16. WIA Adult Females: Program Impact Estimates, UI Comparison Groupo



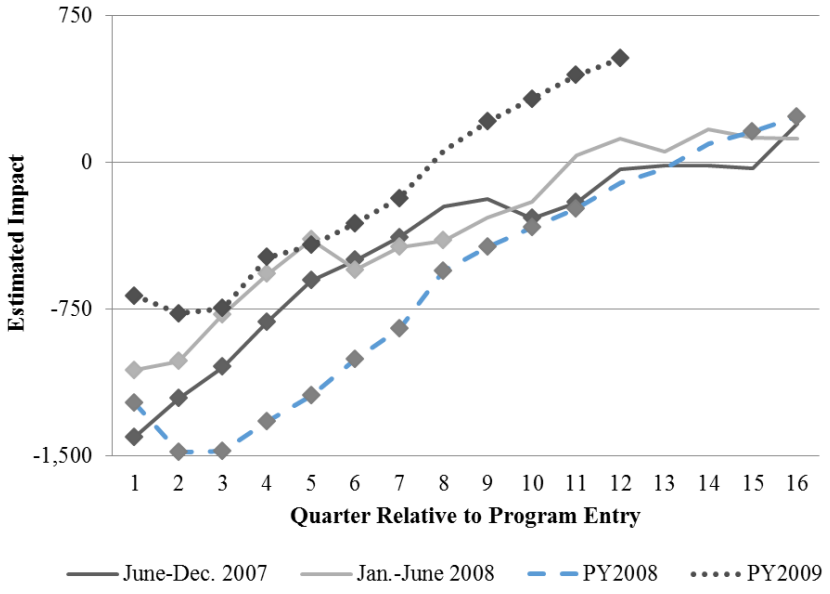
Marker identifies statistical significance at the 0.05 level.

Figure 17. WIA DW Males: Program Impact Estimates, UI as Comparison Group



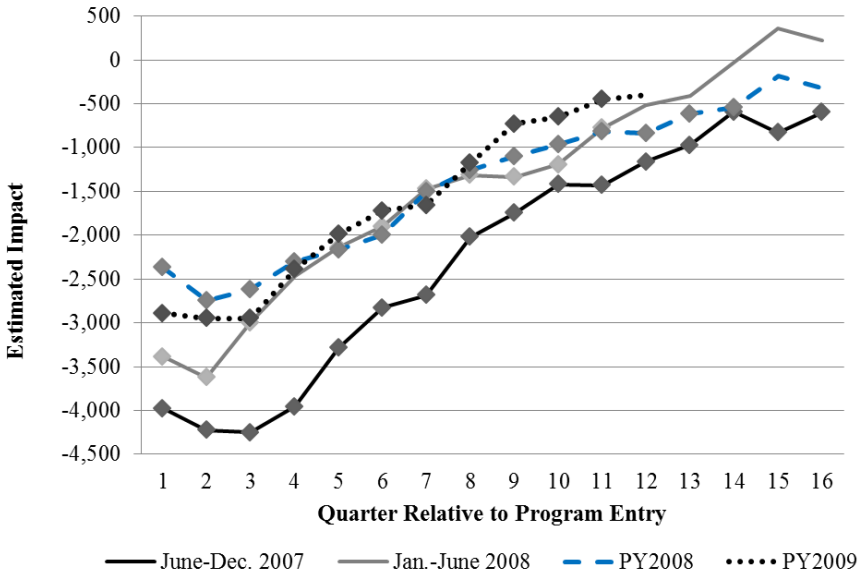
Marker identifies statistical significance at the 0.05 level.

Figure 18. WIA DW Females: Program Impact Estimates, UI Comparison Group



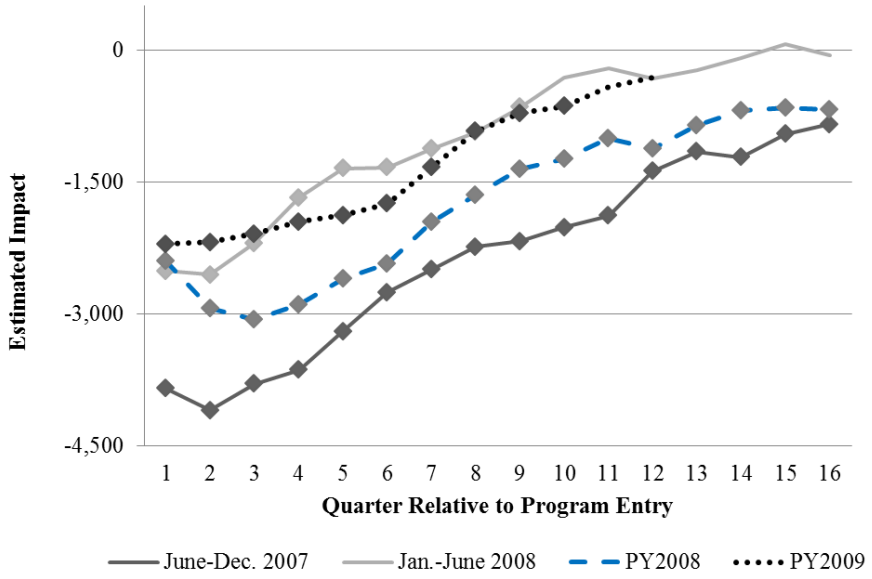
Marker identifies statistical significance at the 0.05 level.

Figure 19. TAA Males: Program Impact Estimates, UI Comparison Group



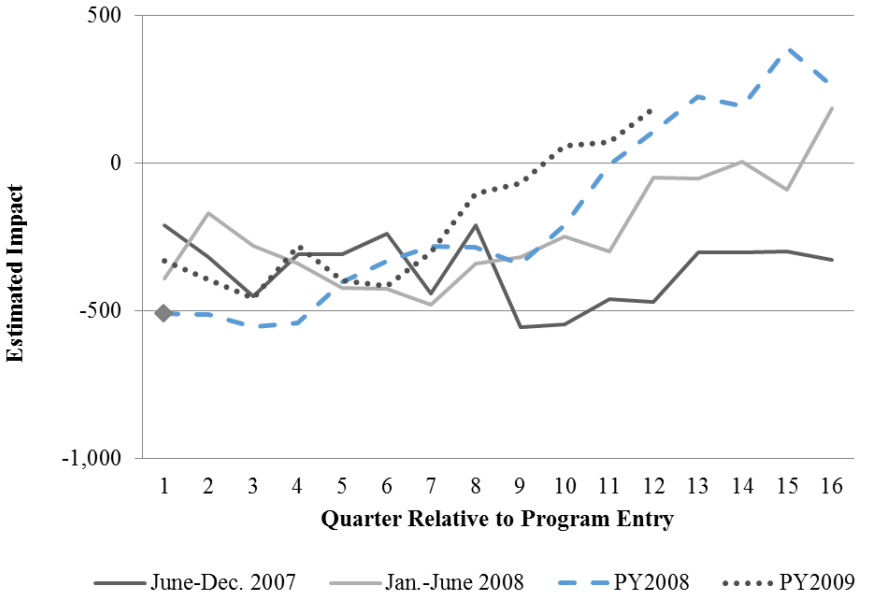
Marker identifies statistical significance at the 0.05 level.

Figure 20. TAA Females: Program Impact Estimates, UI Comparison Group



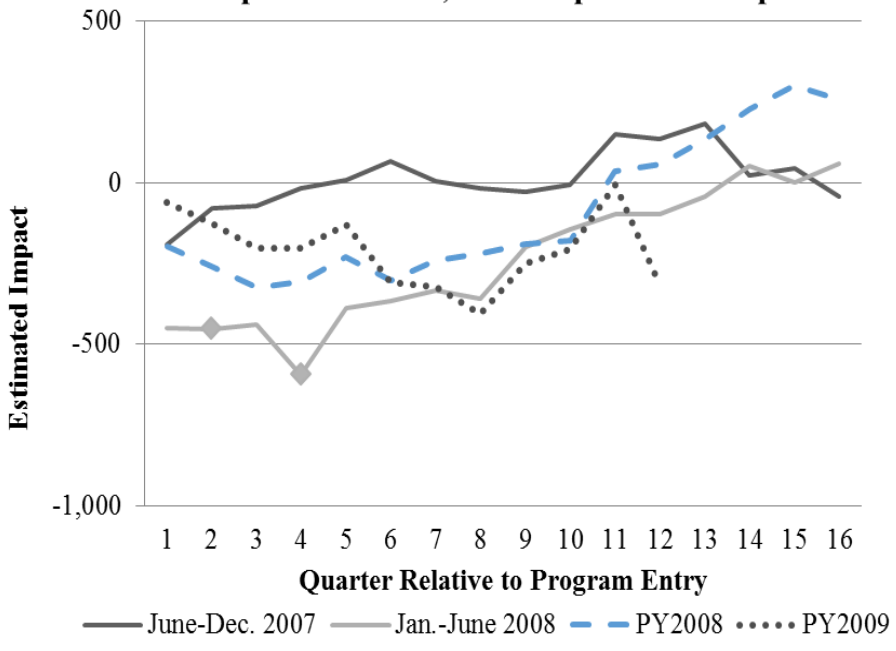
Marker identifies statistical significance at the 0.05 level.

Figure 21. WIA DW Males: Within-Firm Program Impact Estimates, ES Comparison Group



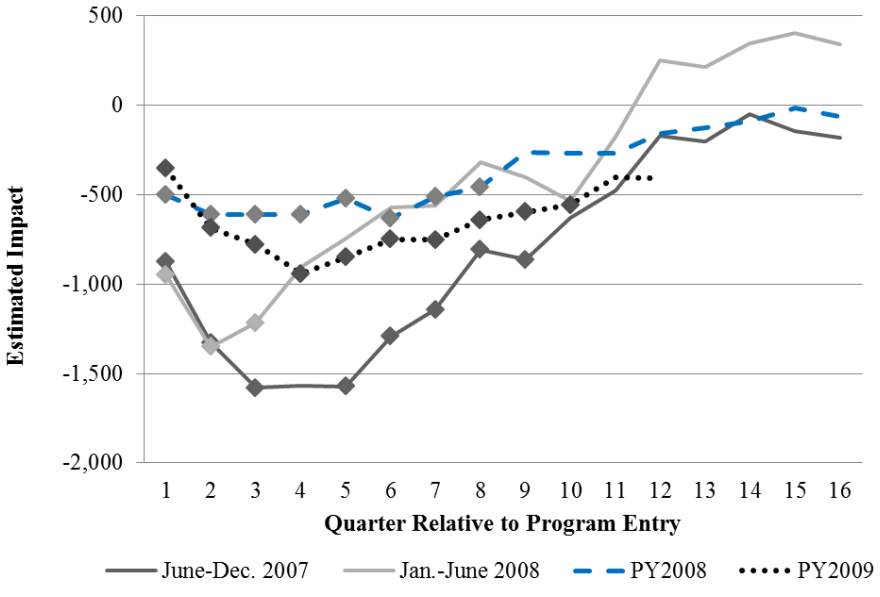
Marker identifies statistical significance at the 0.05 level.

Figure 22. WIA DW Females: Within-Firm Program Impact Estimates, ES Comparison Group



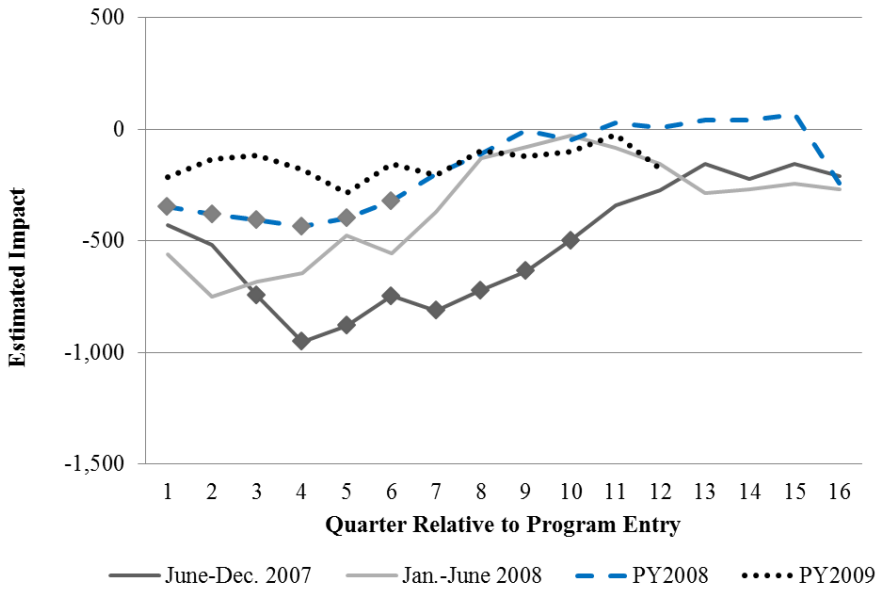
Marker identifies statistical significance at the 0.05 level.

Figure 23. TAA Males: Within-Firm Estimates, ES Comparison Group



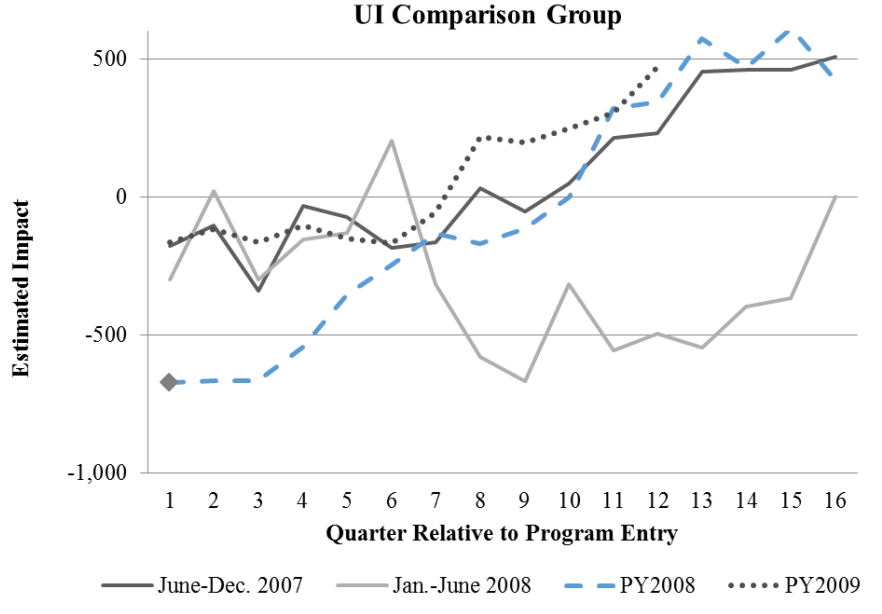
Marker identifies statistical significance at the 0.05 level.

Figure 24. TAA Females: Within-Firm Program Impact Estimates, ES Comparison Group



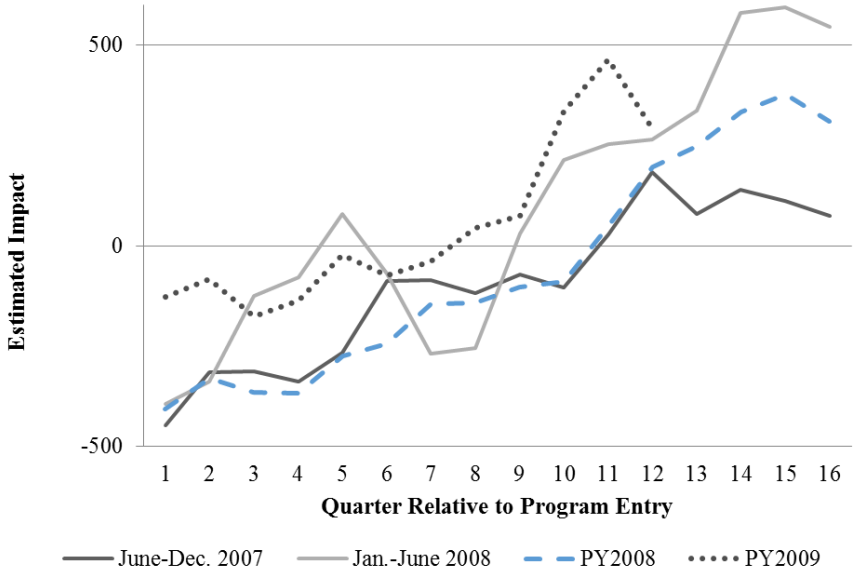
Marker identifies statistical significance at the 0.05 level.

Figure 25. WIA DW Males: Within-Firm Program Impact Estimates, UI Comparison Group



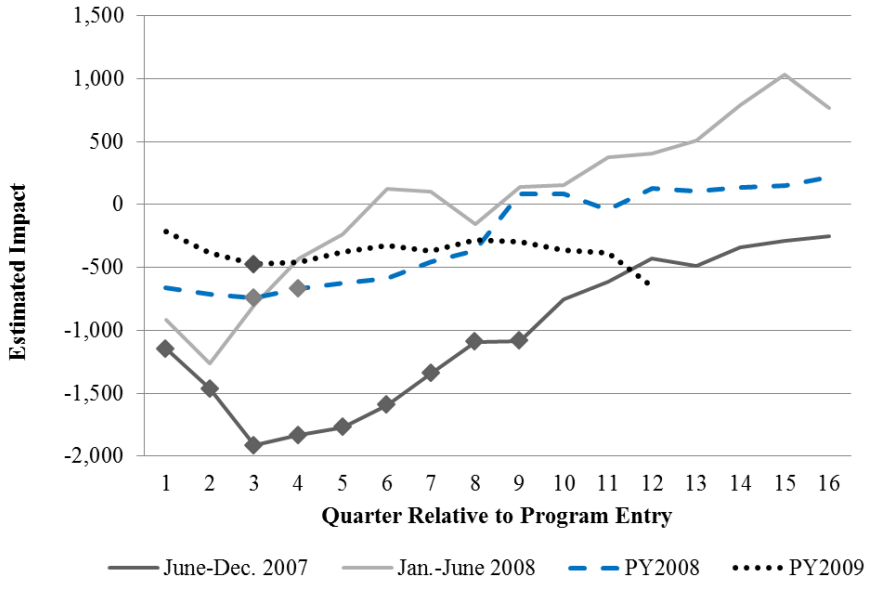
Marker identifies statistical significance at the 0.05 level.

Figure 26. WIA DW Females: Within-Firm Program Impact Estimates, UI Comparison Group



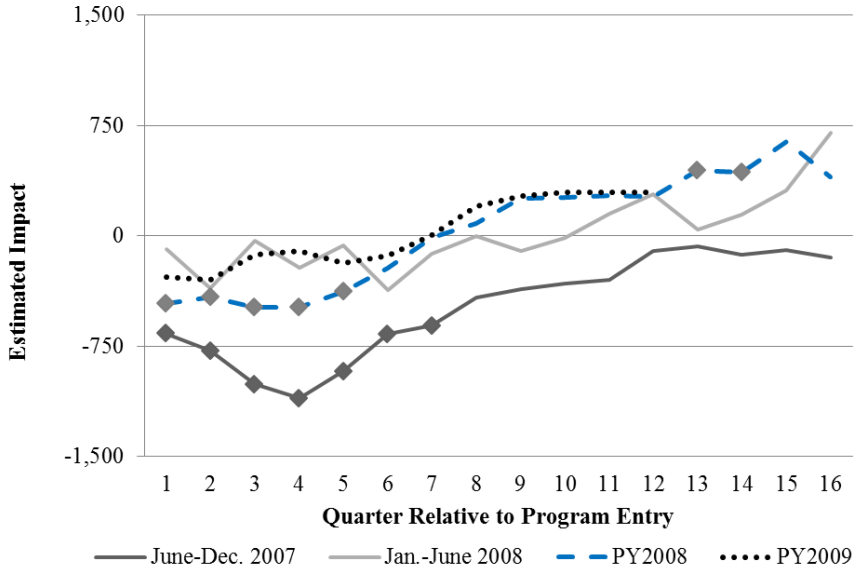
No estimates were statistically significant at the 0.05 level.

Figure 27. TAA Males: Within-Firm Program Impact Estimates, UI Comparison Group



Marker identifies statistical significance at the 0.05 level.

Figure 28. TAA Females: Within-Firm Program Impact Estimates, UI Comparison Group



Marker identifies statistical significance at the 0.05 level.