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MARSHALL UNIVERSITY

Working Paper: 99-03-A

A Dynamic Analysis of the West Virginia Cash Assistance Programs: 1978-1998

by

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Key Words: AFDC, TANF, EITC, Vectorautoregression, Cointegration

Abstract: This paper examines the effect of programmatic and economic changes on aggregate caseloads and recipients in West Virginia from 1978 through 1998. Employing an Error Correction Model form of a Vectorautoregression-Exogenous, and a series of unit-root tests for demographic change this paper finds that: a) AFDC-UP employment waivers (to a small degree) and reduced economic performance caused increases in caseloads, b) the *West Virginia Works* program was effective at reducing the aggregate caseloads, but that the economic performance of the late 1990's was partially responsible for that decline, c) Earned Income Tax Credits were minimally effective at reducing caseloads, and that the assessment of SSI as earned income dramatically reduced caseloads through the sample period. Overall, poverty in the State responded less strongly to economic performance than legislation. This paper found that demographic changes contributed to caseload dynamics during the sample period, but the effects on West Virginia were more modest than elsewhere in the Southeast.

Introduction

Welfare reform legislation together with recent economic performance present serious challenges to research efforts into the causation of caseload variation in cash assistance programs. The difficulty of decomposing the relative effects of these two influences on caseloads has been further increased by the tremendous wave of recipients which began in the late 1980's, peaked in the Autumn of 1994 and fell thereafter. Simply, trends are easier to explain than fluctuations, and few fluctuations have been less accurately forecast than the rise and fall in AFDC/TANF caseloads in the past decade.

The diversity of the programs that have been implemented by the states adds to the challenges of explaining this event. A task that is further complicated by differences in the types and root causes of poverty among and within the states that implemented the programs. Likewise, demographic changes may have played a major part in the increase in caseloads. Research by Gabe [1992] identified the rise in at risk families (single mothers) and an uncertain economy's affect on family formation as the leading causes of the caseload increases. Research by Blank [1996, 1998] and Blank and Ruggles [1997] attributed the caseload variation to economic and programmatic changes, though the focus was primarily on the increase in cases observed during the first half of the decade. However, all three studies suggested that economic conditions were responsible for the majority of caseload reductions. Since these studies were focused at the national or regional level, the state level effects of the economy and program changes are not certain.

Following the passage of PRWORA[1] the *Council of Economic Advisors* hurriedly produced an estimate of the cause of caseload declines across the country. Their report (CEA, 1997) attributed 40 percent of the caseload decline to the improved economic conditions of the mid 1990's and roughly 30 percent to state programmatic waivers implemented during the Bush and Clinton administrations. Their analysis was too proximal to the PRWORA legislation to generate empirical results regarding its impact. There simply were not enough observations after the legislation to provide useful evidence of the programs results. The authors of the study also suggested demographic changes of the type described by Gabe [1992] and changes in *the Earned Income Tax Credit* were in part responsible for

[1]Public Law 104-193, *The Personal Responsibility and Work Opportunity Reconciliation Act of 1996*.

the wave of caseloads that passed through the system between the late 1980's and the early 1990's.

The CEA paper spawned criticism among those researching the caseload variation. The criticism of the research focused on its method, not results. The critical theme really revolved around the aggregation bias of the study. Since the CEA performed a national study there was a general feeling that state, if not individual, analysis should be performed to confirm or refute the results. A state level study of a programmatic change very similar to PRWORA, in Tennessee, (Hicks and Boyer,1999) found very similar results to the CEA study, using different methods. This was likely due to the programmatic similarities between Tennessee and PRWORA as well as the size and diversity of that state's poverty. An impressive study of all states (Crouse, 1999) found similar results to the CEA study, but with widely varying state estimates of the relative effects of program and economic changes. Authors of both studies suggested that state specific variables on economic variation were needed both for forecasting and analysis. State, local and individual studies are currently ongoing. This work is a part of that research, focusing on the dynamics of the cash assistance program in West Virginia.

The one-size-fits-all approach to welfare reform was not a hallmark of PRWORA. Individual states were offered the opportunity to tailor programs to individual state needs. However, West Virginia's program of *West Virginia Works* looked very much like PRWORA, although poverty in West Virginia continues to be rural Appalachian and very persistent.[2] Counties in the south of the State exhibit many signs of deep economic weakness, with double digit unemployment, declining employment in key sectors, and the specter of more job losses on the horizon. A long history of highly fluctuating economic growth in the state suggests that economic variables should be strongly correlated with changes in the cash assistance caseloads. This is unsurprising. However, the rural nature of Appalachian poverty suggests that access to employment, either through inadequate transportation or employer location, presents a significant problem that makes West Virginia different from other states. This, in turn, suggests that programs designed to ease persons into the labor market will be less

[2]West Virginia Works imposed 24 month time limits on commencing work and a 60 month time limit on lifetime assistance. The definition of work encompassed a wide range of activities, and included a Joint Opportunities for Independence (JOIN) which mixed private sector work experience with job search. Most of the programs were similar to PRWORA's outline. West Virginia did link total hours worked to the minimum wage ($5.15 per hour) by dividing assistance dollars by the weekly work requirement and setting a floor at the minimum wage.

effective than in other areas. Thus the *Earned Income Tax Credit* (EITC), or sub-components of different programs aimed at transition, will be less effective in West Virginia than elsewhere. Another by-product of poverty in Appalachia is its persistence. Displacement of local sources of employment slows the clearing of labor markets. This has been especially true of the southern parts of the state where extraction based job losses affected the whole of the local economy. This persistence effect is potentially measurable in an empirical study.

The problems of West Virginia are also evident in the large out-migration of workers. Cities and towns with ten year population declines of 25 percent are not uncommon, and losses of 40 percent are not unknown. Presumably, many of the most skilled workers (and those more likely to benefit from the work transition programs of EITC) have already relocated.

The policy implications for findings of the type described above suggest several appropriate areas of emphasis. First, a lack of significant benefit to a transitional program suggests greater emphasis be placed on the program.[3] Second, emphasis on transportation, child care and other transitional assistance programs recommend themselves to areas where job losses have recently occurred. Thirdly, relocation incentives in lower employment areas should be considered. These recommendations should improve the employment incentives (and opportunities) for current recipients.[4]

This study will attempt to evaluate the effects on cash assistance caseloads and recipients of economic and programmatic changes in West Virginia. These aggregate variables are critical for policy analysis and recommendations. Demographic changes, either in the general population, or among the recipients, has also generated changes in the aggregate program variables. This study will identify the pattern of caseload variation over the sample period, and illustrate a relatively new statistical technique that opens many doors to researchers and answers some specific questions about the long run

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[3]Of course an alternate interpretation of these results is that no further efforts towards transitional assistance be made. I feel that this reading of the program would be an error. Other studies have found statistical significance in this area, but most where job location and transportation issues pose much less of a challenge for the prospective employee.

[4]While training and skill improvement programs are important, it is far less likely that recently employed persons will need basic job skill training. This type of assistance is critical for never employed recipients, but is far less important for a significant minority of recipients in the state.

dynamics of the cash assistance programs.

Program Dynamics, Unit-Root Skepticism and the Vector Autogregression

Analysis of time series variables using standard microeconometric techniques is a dubious proposition where variables exhibit trends in levels.[5] Cash assistance cases and recipients are exactly the types of variables for which an aggregate regression analysis may generate spurious results. Simply, as population increases even declines in the proportion of the recipients may be translated into greater values in levels. This leads to the potential of a spurious relationship between variables.[6] To circumvent this problem, a researcher could use the month to month change (first differences). Better still, if there exists a linear combination of the series that is itself stationary then much of the explanatory power of the series could be retained through use of that equation. If this equation exists the series are cointegrated.[7]

In addition to the unit-root or trend problem, there is the direction of causation between cases and recipients. Due to the explanatory value of these variables on each other, this is problematic. Recipients and cases are undoubtably related, but in ways that due to demographic, economic or programmatic changes, may vary over time. Advances in time series analysis permit the relationship

[5]The existence of a unit root in time series economics means that in practice the variables do not respond in a meaningful way to other variables, though test statistics may indicate otherwise. Thus any regression analysis will yield a spurious result. The details of this are well known in the macroeconomic and statistical literature. For an overview of the econometric issues see Greene, 1990; Granger, 1988; and Cherezma and Deadman, 1998. For additional discussions regarding this in related work see Hicks and Boyer, 1999. It should be noted that a simple trend variable is not typically a sufficient correction for non-stationarity.

[6]Many of the studies mentioned in the text use techniques that are especially vulnerable to spurious regressions. These methods include the family of panel studies, even where some of the variables employed are proportions or rates, not levels. For example, in this study the unemployment rate possesses a unit root (Augmented Dickey-Fuller test failed to reject a unit-root even at weak levels of significance (ADF = -1.32, critical value of -2.57 at the 10 percent level).

[7]An example from economic theory should clarify the notion of cointegration. Measures of supply and demand for a good are likely to be non-stationary series, so the most commonly applied regressions of this will yield spurious results. However, excess demand (the difference between supply and demand) is likely to be stationary because of the market forces bringing these two variables together. Since the variable is a linear combination of each series, supply and demand these two series are said to be cointegrated. This cointegration suggests a dynamic equilibrium relationship exists, for which formal statistical tests are applicable.

between recipients and cases to be tested both for the existence of a long run equilibrium and structural breaks. This paper seeks to do this.

The Model and Cointegration

Testing a model of welfare recipients and cases requires controlling for economic and programmatic changes. Control variables selection in time series analysis involves a less exhaustive use of explanatory variables. This approach is necessary for a variety of reasons, but carries with it some shortcomings.[8] One benefit to employing a time series model with parsimonious structure is in its forecasting strength. Similarly, small models effectively decompose aggregate effects including economic, demographic and programmatic, without being too specific.[9] In time series models special challenges exist in the testing of the model, optimal model selection, the timing of structural breaks and the use of error correction modeling.

The model to be tested is a vectorautoregression-exogenous (VARX). The VARX is a useful tool for testing variables when the direction of causation and/or the persistence of the effects are unknown for a part of the variables under consideration. In this case, the direction of causation between AFDC/TANF recipients and cases is not known.[10] In this model there is strong theoretical (and empirical) reasoning behind the direction of causation between the economic and programmatic

[8]The parsimonious nature of time series models limits the explanatory value. Individuals are not typically modeled with time series, and the strong collinearity of economic and policy variables recommends the selection of a subset of control variables. This also suggests a stronger analysis of the characteristics of the population on which the model is tested. For example, most pooled models use the unemployment rate as a control variable, without regard to the specific characteristics of the population (CEA, 1997; Blank, 1996; Blank and Ruggles, 1998; Crouse, 1999). Time series models then recommend the use of industry specific employment variables in addition (or as a replacement) to the simple unemployment rate. The selected industry specific variable may be obtained from a Case Characteristics study of the AFDC/TANF program (see Fox, et. al.). This relies on a more intensive understanding of the institutions.

[9]For example calculating the overall economic effects from one or two economic variables does not tell which economic effect dominates (e.g. employment in the textiles industry or personal income in the service sector). While this question may be interesting, it probably belongs in a different study, and is of uncertain benefit to other researchers of the cash assistance programs.

[10]These variables are clearly related, but it is the direction of causation that cannot be determined. This lack of theoretical exogeneity suggests the VAR model.

variables and caseloads. Statistical tests of strict exogeneity will also be included.

The VARX representation takes the form: $Y_{i,t} = A_i Y_{i,t-n} + B_j X_{j,t-n} + u_{i,t}$ where $Y_{i,t}$ are cases and recipients from 1978:06 through 1998:12, with their lagged values appearing on the right hand side of the expression with a matrix of economic and programmatic control variables and a gaussian white noise vector. The error correction representation of the VARX follows a determination of non-stationary (in this case with the non-dummy variables as I(1)) with a cointegrating equation among the endogenous variables.[11] The error correction representations (with trend and intercept in the cointegrating equation are):[12]

$Y_{i,t} - Y_{i,t-n} = A_i\left(Y_{i,t-1} - Y_{i,t-j}\right) + B_j\left(X_{j,t} - X_{j,t-n}\right) + B_{i,t} X_{i,t} + u_{i,t}$ with an error correction equation: $y_{2,t} = by_{1,t}$ that enters into the final estimation.[13] The dummies are clearly I(0) and not differenced in this model.

The Data, Variable Selection and Results

The data selected for testing were collected from the *United States Department of Health and Human Resources, Assistant Secretary for Planning and Research*, the *Bureau of Economic Analysis*, or have been generated by the author (policy variables). All data are monthly from 1978:06 through 1998:12 and have not been seasonally adjusted. The data and sample statistics appear in an appendix to this paper.

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[11] An Augmented Dickey-Fuller test fails to reject the null of a unit root for either variable (ADF = -0.574, MacKinnon's .10 level of significance is -1.616 for cases and 1.712 with MacKinnon's .10 level of significance at -3.178 for recipients). A Johansen Cointegration test confirmed these variables were cointegrated with a trend and intercept in the cointegrating equation.

[12] $\Delta y_{1,t} = d_1 - g_1\left(y_{2,t-1} - u - by_{1,t-1}\right) + e_{1,t}$
$\Delta y_{2,t} = d_2 - g_2\left(y_{2,t-1} - u - by_{1,t-1}\right) + e_{2,t}$ more formally.

[13] The Augmented Dickey-Fuller test on first differences for both endogenous variables strongly rejected the null of a unit root in both cases indicating a stationary *I(1)* system.

The selection of dummy variables for policy changes focused on programmatic changes (which could only be evaluated in whole) that potentially imposed a structural change on the system.[14] Structural breaks occur when a change in the cointegrating parameter $ in the cointegrating equation is generated by a change in the variables under examination. This occurred in 1983, for reasons I will discuss later. This suggests that the period before and after the 1983 policy changes be treated as separate periods. Failure to do this introduces several problems.[15]

The economic variables presented a more challenging specification problem. The inclusion of several economic variables clearly endangers the non-collinearity of the exogenous structure.[16] The selection of the unemployment rate is a fairly standard specification (though not without its own problems) which I augmented with the state's total employment in services, light manufacturing and textile and apparel categories. The selection of these series attempted to capture the majority of positions identified by AFDC *Case Characteristics Studies* in the Southeastern United States as representative of AFDC/TANF recipients most recent employment (see Fox, et. al. 1998 for an example)[17].

Much to my surprise, both series were non-stationary.[18] To compensate for this, I employed first differences (which were stationary at *I(1)*). Hence, except for the dummy variables, first

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[14]A cointegrating equation existed throughout the sample period with a structural break occurring after the 1983 Welfare Reform Legislation (Hausman test for structural breaks). The resulting break led to two subset estimations.

[15]Because the endogenous variables are not cointegrated prior to 1983, a cointegrating relationship (as part of the error correction model) in the larger sample is an inappropriate specification. A VARX model may be appropriate for this period, though not as the body of this paper. The use of an intercept dummy variable (such as TANF, EITC, etc.) is inappropriate because it does not account for the change in the cointegrating relationship of the endogenous variables.

[16]Indeed this occurs with any two levels or changes in levels of these variables.

[17]For a fuller discussion of this method see Hicks and Boyer, 1999. For a strong argument in favor of this type of employment selection see Crouse, 1999.

[18]The Augmented Dickey-Fuller test on the unemployment rate provided a test statistic of -1.454 with a .10 percent critical value of -2.598. The employment levels were less surprising (ADF=-1.973 with a .10 percent critical value of -2.598). The existence of a characteristic root outside the unit circle for the unemployment rate raises great doubt as to the value of the regressions in levels of these variables in most studies.

differences were employed throughout the error correction model. All real series were stationary at *I(1)*, all dummies at *I(0)*.

Through minimization of the Akaike Information Criterion, a well known method, the optimal endogenous lag structure was selected . The expected sign of the exogenous variables are straightforward, and require little explanation, estimation results appear in Table 1.

Table 1, Error Correction Results, 1983:10 to 1998:12

	$cases_t$ - $cases_{t-1}$	$recipients_t$ - $recipients_{t-1}$
cointegrating equation ($\$y_{1,t}$)	0.038	0.423***
$cases_{t-1}$ - $cases_{t-2}$	-0.12	-0.117
$cases_{t-2}$ - $cases_{t-3}$	0.171*	-0.040

$cases_{t-3}$ - $cases_{t-4}$	0.173*	-0.285*
$cases_{t-4}$ - $cases_{t-5}$	-0.023	-0.019
$recipients_{t-1}$ - $recipients_{t-2}$	0.017	0.116
$recipients_{t-2}$ - $recipients_{t-3}$	-0.115*	0.009
$recipients_{t-3}$ - $recipients_{t-4}$	-0.045	0.113
$recipients_{t-4}$ - $recipients_{t-5}$	-0.082	-0.066
intercept	0.003	0.011***
TANF	-0.038***	-0.067***
SSI Exclusion	-0.018	-0.008
EITC	-0.007*	-0.012*
AFDC-UP Waiver	0.011	-0.014
$(\text{unemployment rate})_t$ - $(\text{unemployment rate})_{t-1}$	-0.019***	-0.008
$(\text{unemployment rate})_{t-1}$ - $(\text{unemployment rate})_{t-2}$	0.005	0.010
$(\text{WV employment})_t$ - $(\text{WV Employment})_{t-1}$	-0.0000127***	-0.00000114**
$(\text{WV employment})_{t-1}$ - $(\text{WV Employment})_{t-2}$	0.000	-0.000000378***
Adjusted R2	0.43	0.28
F-Statistic	9.066***	5.12***
Log Likelihood	433.4	344.93
Akaike's Information Criterion	-4.53	-3.57

*** Significant to the .01 level, ** Significant to the .05 level, * Significant to the .1 level, All critical values obtained from Rohlf and Sokal's Statistical tables, 3rd Edition, 1995.

The results of the cointegrating equation and the lagged endogenous variables are not clearly interpretable. They are useful in evaluating the predictive relationship between the variables, not in policy or economic analysis.[19] The one issue of interest is the optimal lag length determination of four months. Studies of a state with less rural poverty indicate that the lagged effect of these variables is less than four months (Hicks and Boyer, 1999). This suggests that poverty is more persistent in West Virginia, as could be expected with the rural poverty in the State, although much more study is needed in this area. The intercept only indicates a better fitting equation is obtained for cases when an intercept

[19]There are many instances where the cointegrating vector is useful for interpretation of a long run stable relationship. I am doubtful of that application here.

is introduced. This is not surprising given the magnitude differences between cases and recipients. The policy variables do indicate important results from the regression. To summarize, the introduction of the PRWORA legislation (represented by the TANF variable) and the Earned Income Tax Credit Legislation (EITC) both reduced the overall levels of recipients and cases during the sample period. There was a very weak statistical relationship between an increase in recipients and the AFDC-UP waiver in the late 1980's, as expected. The affect on cases was clearly not different from zero. As expected, the SSI exclusion of benefits has reduced both recipients and cases, but at weak levels of statistical significance.[20]

The economic results indicate that changes in both unemployment rates and the level of employment in selected industries had a negative effect on the changes of recipients and cases. In the case of the unemployment rate, this was initially troubling. However, many previous studies (Crouse, 1999; Mach, 1999 and Hicks and Boyer, 1999) have failed to uncover consistent unemployment rate effects on caseloads.[21] It is likely that this variable is not sufficiently sensitive to local employment variation (industry or location) to explain these data. In any case, though this variable was statistically significant, the magnitude of the parameter estimate suggests there is little economic significance. Including it did not alter the magnitude of the economic effects that will be calculated later in this paper. In response to the Akaike Information Criterion, the second lags of changes in these variables were included in this specification.[22] The equation test statistics (F and likelihood ratio's) were strong, and

[20]The relatively short period of the SSI exclusion, and concurrence of the TANF variable probably swamp the statistical significance of this variable. A later study (incorporating the changes in the exclusion) will likely increase the statistical significance of this variable.

[21]Mach's longitudinal study found a negative relationship between unemployment rates and Take-Up rates in AFDC. The small magnitude of the coefficient in this and other studies points to a relatively insignificant economic effect of the unemployment rate (regardless of direction) on cases.

[22]The idea of an optimal lag length as determined through the optimization of a complexity/goodness-of-fit measure is well developed in the literature (see Hicks, 1999; Hicks and Boyer, 1999; Bozdogan, 1996; Schunk, 1999). The AIC is well suited to this type of specification. Alternate measures (Schwarz-Bayesian measures, or Bozdogan's Information Complexity (AIC-B) extension of the Akaike Information Criterion are omitted from this study.

the Adjusted R^2 was relatively high for an error correction specification.[23]

A potential criticism for the specification of this error correction model is the absence of specific demographic variables. This was a conscience decision which was made for three reasons. First, the use of demographic variables eliminates much of the dynamic characteristics both due to the slow changes and infrequent reporting of these series. Second, the changes in most demographic variables that may have explained the increased caseloads in the late 1980's and early 1990's have continued on their trend, while the aggregate figures on caseloads declined dramatically. Simply, demographic changes, though they undoubtably occur, do not explain the wave of caseloads experienced by the U.S. and West Virginia over the past decade and half. The third reason for excluding demographic variables is that there is a better method of examining whether demographic changes have affected the aggregate levels of cases and recipients.

A method that offers a superior explanation of demographics is an examination of a simple time series, the ratio of recipients to cases. This ratio should be affected by changes in the composition of families either through changes in population characteristics, policy or economic conditions.[24] A look at this series is interesting and useful in illustrating the variation. The series showed a decreasing trend through 1984, following the introduction of the looser eligibility restrictions following 1983. The series then increased steeply and showed much less variation until the 1990's where it began a steady decline that was interrupted only recently. The deep drop in 1996 is not clearly explained, but may be a result of TANF induced eligibility, or more likely due to a definitional change in the State's accounting of the figures. In either case, the change was not persistent, and only weakens the statistical evaluation presented above, not its interpretation. However, it does lessen the interpretation of policy and economic effects on this ratio. The 1984 change, and the ensuing decade long decline in the ratio, are

[23]While the R^2 and it's alternative measures are definitionally the same as a minimized sum of squared errors, they will be used, in part, to decompose the total effects of each category of explanatory variable.

[24]I apologize to demographers who may object to my definitions of demographic variables here, which I try to distinguish in a useful (not pedagogically strict) way from the policy and economic variables I use.

consistent with studies of other states (Hicks and Boyer, 1999).[25]

The series is stationary (at the 10 percent level in an Augmented Dickey-Fuller test). At stronger levels of significance, the series becomes non-stationary. Tests of the series in a number of models are inconclusive. The sole interesting result is a statistical decline in the figure following the implementation of TANF. This is perhaps the result of the 1996 anomaly. Final interpretation of this will have to await more observations. The importance of this series in its demographic interpretation. There is an effect on family size here that is persistent and which is correlated with the number of recipients and cases. Simply, more cases and recipients are strongly correlated with a lower recipient to case ratio. This leads to the unsurprising interpretation that the wave of cash assistance cases was in part composed of smaller families. As the aggregate figures decline the residual caseload will consist of larger families. This is consistent with virtually every important study in suggesting that larger families are likely to remain on public assistance for longer periods.[26]

I suggest that demographic characteristics of race and age cohort are far less correlated with West Virginia's caseload variation than are changes in family size. Economic and policy variables are far more significant in affecting the aggregate numbers of cases and recipients than are demographic characteristics.[27] This interpretation is based upon the data presented above and the demographic profile of the state, which has not varied dramatically (as compared with many other states) in the past fifteen years.[28]

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[25]Indeed systemic shocks to the series either due to accounting changes within the state or programmatic changes, are common. In fact, the accounting of this series is less problematic than many the author has seen.

[26]This is true even after the AFDC-UP program was ended.

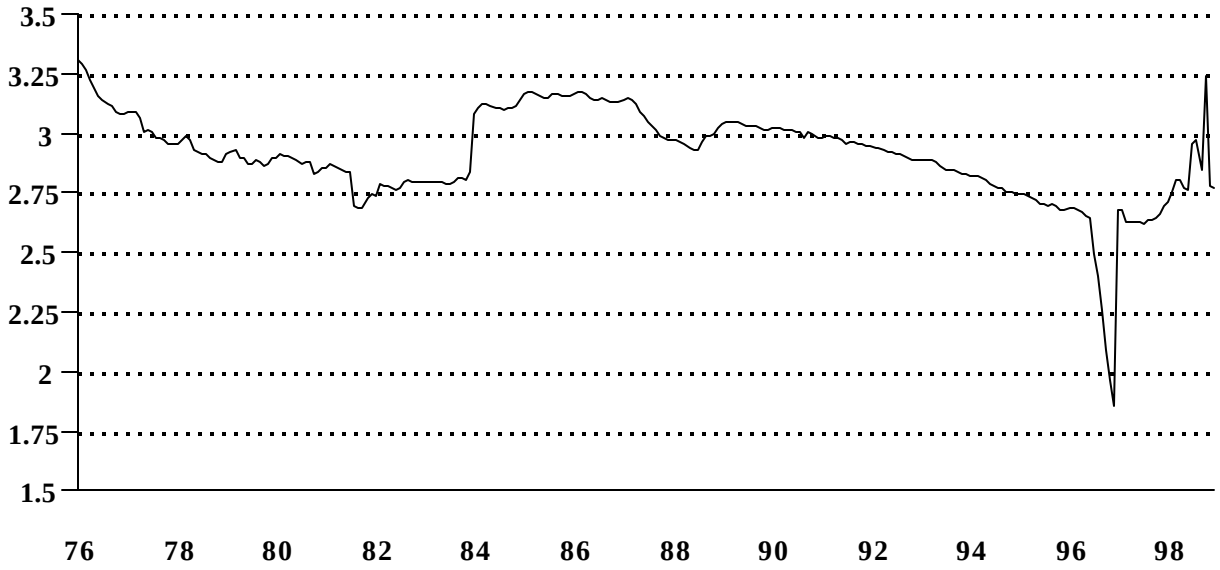
[27]This heuristic is important for both analysis of policy and forecasting, since demographics are not influenced by demographics *and* the autoregressive components of the forecast model, which capture potential demographic changes. Simply time series models are inappropriate for variables that do not possess short run dynamics.

[28]West Virginia's average age has increased primarily due to out-migration. This out-migration occurred during the late 1980's when caseloads increased. The out-migration should have resulted in a net reduction of caseloads during the period. The average age in the State continues to change, but due more to the residual effects of earlier migration than to current effects of migration today. This issue was not explored in this study because the mobility of AFDC recipients was much more limited during the sample period (pre *Saenz v. Roe, 1999*). A separate demographic study may be of potential benefit, but must control for policy and economic effects. Given that net out-

Simply, demographic changes, either through cohort age changes, net migration or ethnic variation, have occurred too slowly to significantly explain the variation in aggregate caseloads that have occurred in the past decade and a half. Demographic changes which have changed the AFDC/TANF caseloads are primarily due to policy innovations which vary the average family size.

A decomposition of the total policy and economic effect on caseloads can be made using this

Figure 1, Recipients to Cases Ratio, 1976 through 1998



model, though it is somewhat problematic because of the timing of the policy. Firstly, the SSI exclusion, according to our model reduced caseloads by just under 6,400 since its implementation. The number of recipients affected is estimated at just under 16,500. The Department of Health and Human Resources (DHHR) estimates of these values, taken from a recipient survey, are 6,600 and 20,000 (looking at five additional months in 1999 than did this study). This models' results are quite close to this, likely overlapping in error and sample variance. This provides substantial hope for the accuracy of the model (and the DHHR estimates), or at least exposes us to making similar errors.

Decomposing the other policy and economic impacts is more complicated because of

migration was very small compared to caseload variation, and the caseloads declined when they should have risen in a migration response and that benefits did not easily transition to other states, it is unlikely that research into migratory effects on caseloads will be fruitful.

differently timed policies and because I am proxying all economic activity with just two economic variables. An additional problem is that the policy variables may have estimated reductions in caseloads greater than the actual reductions observed in the data. This is expected because the legislation not only reduced the number of cases that existed when it was implemented but also reduced future entrants into the cash assistance programs. This means that a policy, by reducing potential new cases, may have had the actual effect of reducing caseloads by a greater number than actually observed. Therefore, I have tried to break the total economic and policy effects into three remaining areas: economic, TANF and EITC. As a result, the effects of each can be estimated over a common time period. I chose the implementation of TANF in 1996 as the period from which to estimate total caseload reduction.[29] From these calculations I have found that of the total decline in caseloads since then, 56 percent is attributable to TANF (*West Virginia Works*), 16 percent due to the state's economic performance and just under 5 percent due to the *Earned Income Tax Credit* legislation. The remainder was the SSI exclusion within *West Virginia Works.* The total reduction in caseloads due to *West Virginia Works* (TANF) is then roughly 11,900, with about 2,100 due to the bettered economic performance of the state and roughly 1,000 fewer cases due to EITC. The response to these variables by total recipients was nearly proportional.

These findings are consistent with the research performed elsewhere. Previous studies (CEA, 1997; Hicks and Boyer, 1999) found much stronger economic effects nationwide, and in Tennessee, a state with much less rural poverty than West Virginia. Since, 1996, both the national and Tennessee economies have performed much more robustly than West Virginia's. Hence, the economy will likely play a much greater role in caseload reductions. Both of these studies found about 40 percent of the caseload reduction was caused by economic performance, with about 30 percent due to TANF. In the study of Tennessee, which included EITC in the sample, the researchers found that just under 30 percent of the caseload reduction was due to that legislation. Again, the lower proportion of the

[29]I took the total derivative of the equation (after returning the values of the dependent variable from the natural logarithm to their actual changes) and assigned the proportionate change of each of the explanatory variables to the total changes. I excluded from consideration lagged endogenous variables and the insignificant policy variables.

caseload reduction being caused by EITC in West Virginia is consistent with the State's particular poverty problems. Rural poverty, especially that following declines in the extraction industry has left West Virginia with much more persistent poverty in areas where available jobs are few. This suggests that programs designed to ease workers into jobs, where they are available will be much less effective in West Virginia than in other states. This study has borne out that expected result.[30]

What does this potentially mean for the *West Virginia Works* program. Firstly, it is obvious that the end of the SSI exclusion will dramatically increase the caseloads in the State by more than 20 percent. Second, the continuation, at its current level, of the Earned Income Tax Credit will have little additional benefit for State residents in need of marginal increases in assistance to spur entry into the labor market. This is primarily a labor market problem with few quick fixes. This is evident not just in the poor showing of the EITC variable but also in the weakness of the economic contribution to overall reductions in the caseloads. TANF, in the form of *West Virginia Works* has been remarkably effective at reducing cash assistance cases. Whether this is good public policy, especially when in relation to the SSI exclusion is another matter. Part of the relative effectiveness of the *West Virginia Works* is caused by the relatively poor economy (in comparison to the nation as a whole). However, compared with other states, the overall reductions in cash assistance cases have been remarkable (even excluding the reductions caused by SSI exclusion). Part of the reason for this may be the out-migration that has occurred in the State, but more likely it is the programmatic changes that have caused reductions. Whether or not economic social welfare has been broadly improved is outside the scope of this study. A robust fiscal improvement in the program is clear.

Conclusions and Forecasting Models

Policy recommendations should always be made following extensive research, however, from these results two suggestions can be made. First, the poor economic performance of many West Virginia counties is a condition that will not be rapidly ameliorated, sound guidance regarding migration

[30]These results were closely reflected in the impulse response function effect on the variables. See the included appendix for the IRF.

may be a necessary component of social work programs in these areas. This is particularly important since the *Saenz v. Roe* decision. Second, the managerial difficulties within DHHR, vast as they have been in the past decade are likely to remain a challenge through the next decade. A solid forecast of caseload variation is an important component of this program. A model like the one presented here is especially attractive for forecasting caseloads and recipients. Because this model does not contain nominal variables (such as dollar figures or interest rates) the predictive nature of the model itself is much stronger than in many other forecasting models. In order to test the robustness of the model, a test of forecasting capacity was performed on calendar year 1998. The model was estimated through December 1997, and the remaining known variables were forecast. The result of this in-sample forecast was a twelve month forecast that in its worst month overstated caseloads by 6.3 percent and recipients by 4.8 percent. This performance in preserved out of sample periods is very strong for any forecast.

The combination of a decomposition of economic and policy variables with a robust forecasting tool should provide much needed information concerning future caseload and recipient variation.

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