Draft: Revised 9/23/2004 1:53 PM

Market Mechanisms in the Formal Child Care Market:

Why the Slow and Inconsistent Expansion in Supply?*

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*This research was funded in large part by a grant from the Foundation for Child Development, for which I gratefully acknowledge FCD Director, Ruby Takanishi. I also acknowledge significant support from Hartwick College through its Wandersee Scholar-in Residence program. Additionally, I would like to thank Kirk Davis, Caroline Carbaugh and Ann Ross for their help in making available the special tabulation data, and Tiffany Ross for her essential research assistance. I remain solely responsible for all errors and omissions.

Section I: Introduction and Motivation

The vast majority of working age women in the United States is now engaged in the labor force, including nearly 60% of the mothers of pre-school aged children (U.S. Department of Labor, 2004). In parallel with current levels of female employment, twenty million children received some form of non-parental care in 2002 (Sonnenstein et al, 2002). In an environment where women continue to work in ever greater numbers and where welfare reform policy explicitly holds maternal employment as its goal, the need for appropriate child care to support working parents and to promote the healthy social and cognitive development of their children is evident.[1]

The decade of the 1990's provides an unprecedented opportunity to analyze formal child care supply dynamics (both center care and family home care) as that period witnessed substantial changes in the key theoretical drivers of child care demand. The combination of favorable economic conditions and mid-decade "PRWORA" welfare reform legislation significantly increased the labor force participation rates of mothers of pre-school aged children. Simultaneously, direct and indirect child care subsidy spending grew exponentially between 1990 and 2000. However, actual expansion in child care quantity supplied at the local level was highly variable across regions and generally sluggish over the period.

Using a new panel dataset of county-level child care supply measures augmented with local demographic data, state AFDC/TANF and tax policy, and state child care spending and regulatory variables, this paper contributes to a substantial child care

[1] See (Chase-Lansdale et al, 2003; Ruhn, 2004) for excellent recent reviews of the substantial interdisciplinary literature on the relationship between maternal employment, child care use, and child development. In addition, a number of authors have explored possible mediating effects of care quality on those relationships. See (Votruba-Drzal, Coley and Chase-Lansdale, 2004) for a recent review of that literature.

literature by systematically examining and quantifying the *determinants* of local care expansion for the United States as a whole between 1990 and 2000. The role played by recent child care policy and demographic changes in the expansion of care receives special attention, as do rural-urban differences in supply dynamics.

Results indicate that lagged female employment and state and federal subsidy spending (both directly and via tax incentives) positively and significantly impacted upon actual county level child care quantity expansion, with employment increases generating approximately 10% of the expansion (or 2.4 child care workers per 1,000 children), tax policy generating approximately 15% of the expansion, and direct subsidy spending increases of $1,591 per child in poverty generating approximately one third of the expansion**.** These results differ for rural vs. urban and poor vs. affluent areas, with poor and rural areas yielding the biggest response to policy intervention.

The remainder of the paper proceeds as follows. Section II provides background on the child care market and a brief review of the literature. Section III provides a theoretical justification for the empirical model and presents the modeling technique employed. Section IV provides information on the dataset construction, the dependent and independent variables, and comments on the descriptive statistics of those variables. Section V presents the results of the empirical analysis. Section VI concludes with a discussion of the policy implication of the empirical findings.

Section II: Background and Review of Literature

The implementation and/or expansion of programs such as the child care development fund, the child and dependent care tax credit, and employer-sponsored "flexible spending plans" during the 1990's speaks to the policy community's active

response to issues of child care provision. Funding for low income child care alone increased from $4B to $9B between 1996 and 2000 (Mezey et al, 2002). In theory, policy-supported child care subsidies and tax credits should increase the effective demand for care services and encourage new centers to enter the market and/or existing centers to expand capacity, thereby increasing the quantity of care supplied in the localities in which they are most needed.

However, aspects of the childcare market compromise both the validity of this argument and the effectiveness of existing policy interventions. First, both a lack of parental information on true care quality and the financial magnitude of the child care investment (9% of income for all families paying for care and 18% for low income families (Giannarelli, Adelman and Schmidt, 2003)) render parents fairly price sensitive (Meyers et al, 2002; Blau and Hagy, 1998).[2] Second, facility start-up costs estimated at $11,000 per child in a new facility (Cubed, 2002) and ongoing labor costs driven in part by regulations on child:teacher ratios in the industry limit profitability (Schulman, 2000), especially given that costs are rarely fully covered by policy interventions. Third, structural barriers to demand exacerbated in rural and low income areas such as a lack of adequate transportation, shortages in the child care teacher market due to low levels of human capital, and geographic dispersion may place constraints on both parents and providers.

Finally, the availability of nearly limitless unregulated informal kith and kin care options provides price sensitive, schedule-constrained parents with alternatives to high priced regulated formal care. Demand may bypass the formal market entirely and limit

formal child care expansion despite policy efforts aimed at building that form of childcare supply. Indeed, that actual subsidy (usually for more "formal" care options) take-up among low income eligible families remains low, despite a growing consensus that such receipt promotes employment success (US General Accounting Office, 1994; Meyers, Heintze and Wolf, 2002; Ficano, Genetian and Morris, 2002) speaks directly to this fact.

A number of early regional and national studies of local child care markets document the limited and inconsistent expansion of formal child care quantity (Willer et al, 1991; Kisker et al, 1991; Siegel and Loman, 1991; Whitebook, Howes and Phillips, 1989; Blau and Robins, 1991). Additionally, (Fuller and Liang, 1996) carefully model supply and demand in the child care market using a sample of 100 nationally-representative counties in 1990 to explain local variation in preschool availability. (Gordon and Chase-Lansdale, 2001) document national variation in local child care quantity using a variety of data sources including the 1990 U.S. Census and various iterations of the Economic Census.

Detailed recent state-specific studies indicate that weak and irregular local expansion is ongoing. Between 1996 and 1999, Massachusetts saw a 26% increase in licensed subsidized Family Child Care capacity, but only a 7% increase in licensed subsidized center capacity (Witt et al, 2000). Earlier analyses found local levels of care in the state to be highly variable (Fuller, 1996). In CA, the number of center and pre-school slots rose only slightly between 1996 and 2000, with some counties experiencing no growth in capacity (Fuller et al, 2002). Finally, between 1996 and 1998 regulated

[2] Although recent research indicates a parental willingness to pay more for "process" (as measured on the ECERS and ITERS scales) as opposed to "structural" (e.g., lower child:staff ratios) quality (Blau and

child care supply increased by a mere 5.5% in Illinois and by a slightly higher 6.1% in Maryland, with low income counties in each of the two states seeing virtually no change in capacity (Kreader, Piecyk and Collins, 2000). Nationally, rural expansion is less consistent than that in more urban areas, despite similar or higher rates of growth of female employment (author's calculation, 1990 and 2000 Census data).

Understanding the key drivers of actual child care expansion at the local level, as well as the extent to which such drivers differ by county characteristics such as county affluence, rural/urban status, and informal child care availability, is important. Specifically, if rising female employment rates and child care subsidization (for all income levels) is failing to generate an adequate expansion in the quantity of formal care to meet the needs of the population, then remediation is warranted.

Section III: Theoretical and Empirical Frameworks

Following basic economic theory, the interplay of child care supply and child care demand at the county level determines the quantity of formal childcare observed in the market as follows:

$$Q^D = f^D(P_{CC}, I, P_R, S_D, N, \phi)$$
$$Q^S = f^S(P_{CC}, C, R, S_S)$$

where P_{CC} represents the unsubsidized price of child care, I represents consumer income, P_R represents the price of related substitutes and complements, S_D represents demand subsidies, N indicates the number of potential consumers, ϕ represents a vector of preference shifters, C represents the direct operational provider costs, R represents indirect costs associated with quality regulations, and S_S represents supply subsidies (e.g., direct contracting with a provider). In theory, given the appropriate exclusions in each of

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Mocan, 2002).

the two equations above, one can linearize this system and solve empirically for the underlying structural coefficients by setting $Q^S = Q^D = Q^*$ (observed equilibrium quantity).

However, given the lack of reliable national data on local or even state child care prices, such structural estimation is not feasible in practice. Alternatively, I generate the following reduced form equation for equilibrium quantity, Q* in years 1990 and 2000:

$$Q_{year}^{*} = f(I, P_R, S_D, N, \phi, C, R, S_S) + \alpha_{year}$$

where alpha is a time invariant measure of unobserved county heterogeneity.

While it is computationally simple to linearize and estimate the reduced form equation above for 1990 and 2000, the presence of a number of biases complicates assignment of causation to the results. First, the model suffers from fixed effects / heterogeneity bias if unmeasured aspects of the county influence both observed child care quantity supplied and a number of the key explanatory variables (e.g., female employment levels). I capitalize on the longitudinal nature of the data by first differencing the above equation in order to net out unobserved time invariant community effects. First differencing produces the following regression equation:

$$\Delta Q^{*} = \beta_0 + \beta_1 \Delta I + \beta_2 \Delta P_R + \beta_3 \Delta S_D + \beta_4 \Delta N + \beta_5 \Delta \phi + \beta_6 \Delta C + \beta_7 \Delta R + \beta_8 \Delta S_S$$

to explain observed local variation in formal child care quantity expansion as a function of changes in neighborhood socio-demographics, child care regulation, child care spending, and underlying economic cost drivers. This model purges the coefficients of heterogeneity problems. Note that selected tables to be presented contain coefficients from individual year 1990 and 2000 regression equations as well as a 1990-2000 change

equation, although discussion centers around the change models for the reason described above.

In addition, as local female labor force behavior is likely to both affect and be affected by local child care availability, contemporaneous measures of those two variables yield simultaneity bias. For this reason, I include lagged (1999) female employment variables. I include instrumental variables models in the appendix to confirm robustness.

Finally, simultaneity bias with respect to the policy parameters exists if child care policy responds to child care availability. However, as the policy variables represent state measures while the child care supply variable represents county data, acceptance of the reasonable assumption that state policy responds to aggregate state supply and not county level variation in that supply controls this bias.

Section IV: Data and Variables

The empirical analysis in this paper utilizes a unique new dataset on county level supply and demand determinants in the child care market. Measures of formal child care quantity come from special tabulations of the 1990 and 2000 U.S. Census of Population and Housing. Specifically, I tabulate all individuals currently working in the county employed in industry 862 (child cay care services) or 863 (family child care homes) in 1990 and all individuals employed in industry 847 (child day care services) in 2000.[3] For these individuals, I have additional information on annual earnings and education levels which proxy for the median center labor cost in the county and the potential quality of care in the county, respectively. Although far from an exhaustive measure of the actual

child care market, the national aggregates of my figures approximate recent estimates of the size of the paid child care market (Burton et al, 2002).

County level data from the 1990 and 2000 Census of Population and Housing public use STF-3 provide rich information on aggregate county-level work behavior (percentage of women employed in 1989, percentage of women employed full-time year round in 1989, percentage of working population working non-traditional hours, percentage of working population employed within the county, and average travel time to work)[4]; socio-demographics (education, marital status, preponderance of subfamilies, percentage of population born in state of current residence, race/ethnicity, percentage of the population foreign born, and linguistic isolation); and contract rental rates, income, and public assistance receipt likely to influence formal child care demand through individual preferences and/or budget constraints and formal child care supply through input costs.

Specifically, one would expect high rates of female labor force participation to enhance demand, while relatively lengthy commutes and non-traditional work hours may reduce utilization of formal child care options due to location/schedule constraints. The presence of a spouse and / or other adult household members (e.g., subfamilies) may minimize the need for formal paid care outside of the home, and low levels of family geographic mobility (proxied by a high percentage of current residents being born in the state) may indicate the availability of inexpensive informal kith and kin child care

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[3] Due to a revision of industry and occupation codes between 1990 and 2000, the comparability of occupation numbers between 1990 and 2000 have not yet been verified. However, Census officials support a clear crosswalk between industry codes 862 and 863 in 1990 and 847 in 2000.

[4] Note that female employment variables are lagged to minimize problems with endogeneity. In addition, instrumental variables models are run to test the robustness of the results given the potential endogeneity of the female employment and lagged work schedule variables.

alternatives. Race and/or ethnicity have been documented to affect preferences for formal care (Brown-Lyons *et al*, 2001), as have mother's age and education level. In addition, a high percentage of foreign born individuals may indicate a large potential supply of informal care alternatives given that one study estimates 43% of informal care providers to be of Latino descent (Fuller et al, 2000). As both extremely low and extremely high income levels are associated in the literature with rising child care availability, I include median income and its square in the empirical analyses.

In addition to county level data, I include controls for state welfare, spending and tax policy that may impact the child care market. Specifically, state level child care quality regulations are likely to influence actual child care quantity through two distinct channels. First, *ceteris paribus,* quality regulations raise the centers cost of providing care and decrease the supply of such care. Second, quality regulations may increase the demand for care by enhancing the utility obtained from its purchase by parents. As such, the predicted empirical impact of regulations on quantity is ambiguous. Combined 1990 federal Social Services Block Grant (SSBG), Title IV-A, and state-initiated child care subsidy funding; 2000 SSBG, Child Care Development Fund (CCDF), TANF transfers, and state maintenance of effort funding; and state and federal child care tax policy in 1990 and 2000 likely enhance demand and thus observed quantity. Note that to the extent that contracting practices paid such subsidies directly to providers, the subsidies are also likely to enhance supply, with the same end result on child care quantity.

Finally, given the potential for systematic supply and demand differences between rural and urban areas, I control for the degree of county urbanization using the Beale

Codes (explained in Ghelfi and Parker, 1997), and I include a county geographic size variable in all models.

Table 1 provides descriptive statistics for the 1990 and 2000 samples. Note that the average U.S. county experienced an increase in child care quantity, both in absolute terms (169 child care workers) and per pre-school aged child (24.15 child care workers per 1,000 pre-school aged children), although this increase was not uniformly distributed across counties. In fact, the lower decile of counties exhibited a net loss of care providers over the decade. A slightly higher percentage of child care workers possessed high school and/or college degrees in 2000 than in 1990. This coupled with more stringent child:staff ratio and teacher training regulations indicate a potential for a higher quality as well as quantity of care provision in 2000. Surprisingly, however, especially given the increase in teacher education levels, real child care worker wages (in 1990 dollars) actually dropped over the decade from $6.94 per hour in 1990 to $5.90 per hour in 2000.[5]

The post-PRWORA era boasts a significantly modified system of federal and state support for welfare-transitioners. While all states in 1990 were mandated to provide 12 months of transitional child care, less than 3% of U.S. counties were in states that provided extended benefits. In contrast, only slightly more than one half of U.S. counties were in states that provided any transitional child care benefits in 2000, but one quarter of all counties received transitional care well beyond one year. Sample estimates of mean levels of state and federal dollars per child in poverty expended directly on child care services (including Social Services Block Grant child care spending, welfare spending

[5] These figures use U.S. County Business Pattern data. Using Census data, average annual earnings divided by the average hours worked per week changed from $196.87 for center workers and $114.29 for family home providers in 1990 to $164.16 in 2000 for the two groups of providers combined. The Census did not separate the provider categories in 2000.

under Title IV-A and/or CCDF, and state-initiated spending) increased substantially over the decade, although again, the level of spending change varied widely from a low of $611 per poor child in Nevada to a high of $3,282 per poor child in Wisconsin. Smaller but similar increases are notable in Head Start spending. In addition to direct subsidy programs, low income working parents also became eligible for a highly expanded set of state child care tax credits, with 20% of U.S. counties in states providing a refundable tax credit and over 40% in states providing either a refundable or non-refundable credit in 2000 as compared to 5% and 32% respectively in 1990.

The data reflects the changing demographics of the country through an increasing percentage of foreign born, non-white and linguistically-isolated individuals, signaling the potential for both an enhanced supply of informal child care workers and enhanced consumer preference for such care**.** As expected, counties witnessed increased levels of female labor force participation and employment and a 5 percentage point drop in public assistance receipt from 8.4% to 3.4%, likely due to the combination of favorable economic conditions and the mid-decade welfare reform legislation.

Tables 2a-2c give a description of selected variables by degree of urbanization. Although relative to "urban" and "urbanized" counties, "less urbanized" and "rural" counties exhibited lower levels of female employment in both 1990 (56% vs. 62%) and 2000 (59% vs. 64%), slightly higher rates of growth of full time year round and overall employment worked to partially close that gap. Not surprisingly, urban counties boasted higher levels of foreign born residents and income. Policy variables did not differ significantly by degree of urbanization.

Noteworthy, however, is the fact that the relatively consistent average child care quantity increase per child across all county types (between .022 and .025 providers per child less than six) masks a large variation in the county level distribution of these quantity changes. As Table 3a demonstrates, "less urbanized" and "rural" counties are much more likely to have either significantly increased or significantly decreased child care quantity per child than their "more urbanized" and "urban" counterparts, and the distinction only becomes more pronounced when one compares strictly "rural" and strictly "urban" counties . This indicates that a closer examination of the rural counties may shed light on the determinants of supply expansion variation noted earlier. Similarly, consistent average quantity increases in low and high income counties (defined by having income below or above the sample median and presented in Table 3b) masks larger variation in quantity expansion in poorer than more affluent counties that also warrants closer examination.

Section V: Results

Table 4 presents the model estimates for the 1990, 2000 and change data in columns I, II, and III respectively. Table 5 summarizes the results when separate analyses are run for rural and urban counties. Table 6 does the same for separate analyses based upon median county income. In all models, the dependent variable is number of child care providers per child less than age six, and all standard errors are corrected for possible heterscedasticity. (Appendix Tables 2A and 2B present results with instrumented "proportion of females working.")

IV.1 Results from Base Model (Table 4)

While the individual year models do a fair job explaining variation in county level child care (adjusted R-squares of .43 and .40, respectively), the change model is much weaker. This is in part an artifact of the inherent difficulty in explaining dynamic as opposed to static conditions. However, as mentioned in the empirical discussion earlier, one significant statistical benefit of the change model is its ability to net out unobserved county fixed effects (unobserved heterogeneity) that may bias the coefficients in the 1990 and 2000 models through correlation with key explanatory variables. Clearly, such heterogeneity is influencing a number of key variables in those models. As such, the change model provides the most compelling evidence for causation.

A. Did Policy Impact Expansion?

With respect to the role of policy interventions in child care quantity, direct child care spending levels (through SSBG, Title IV-A, and various state initiatives in 1990 and through the SSBG, CCDF, state MOE and TANF-diversions in 2000) are positively and significantly related to quantity levels in 2000 (the 1990 coefficients represent a similar, albeit insignificant relationship). Perhaps more importantly, expansion in funding at the state level over the decade positively and significantly impacted upon county-level quantity expansion, with a $1,000 increase in funding per poor child leading to an increase of 5 new providers per 1000 pre-school aged child. The actual increase in spending per child under age six living in poverty over the 1990-2000 period of $1,591 generated nearly 8 new providers per 1000 pre-school aged children or one-third of the total observed increase in care providers.

Interestingly, funding for Head Start had an inverse relationship with child care quantity levels in 1990 and 2000 and with quantity expansion over the decade. Given

that the measure of child care quantity used in the analysis excludes "pre-kindergarten and kindergarten teachers," this inverse relationship likely represents a county-level tradeoff derived perhaps from shortages in qualified daycare / pre-school teachers. As Head Start dollars enter a community and, presumably, Head Start facilities expand, lead teachers may be drawn away from child care settings towards the more financially lucrative Head Start/pre-school settings. That this effect is most prevalent in rural counties, where skilled labor shortages tend to be most acute, supports the validity of this hypothesis.

State tax policy positively correlated with quantity levels in 1990 (non-refundable tax credits) and 2000 (both refundable and non-refundable tax credits) and induced an increase of 3.3 providers per 1,000 pre-school aged children or approximately 15% of the total child care expansion over the decade. In addition, the existence and expansion of AFDC and later TANF extended transitional child care benefits positively correlated with quantity levels in 2000, and removal of that policy at the state level negatively affected quantity expansion between 1990 and 2000. The negative (and statistically-significant) impact of this variable on 1990 levels is likely due to idiosyncrasies in the small number of states that had such a program in place by 1990.

B. Other key drivers of expansion

Of immediate note in all models is the crucial relationship between county-level work behavior and child care quantity. Specifically, an increase in the previous years' proportion of females employed associates with a significant increase in child care levels in 1990 and 2000 as well as county level child care expansion over the decade as evidenced in the change model. The increase in female employment observed during the

1990's associates with the addition of 2.4 child care workers per 1000 pre-school aged children in the average U.S. county, or 10% of the total actual expansion. Note that these results are robust to two-stage least square estimation using county mean wage as the identifying instrument for female employment (see Appendix Tables 2a-2b). Clearly, the child care market responded to the most direct driver of child care demand, namely female labor force participation.

Further, counties with more females working non-traditional hours exhibit lower levels of formal child care quantity in 1990, although the expansion of such employment does not seem to significantly impact upon child care quantity growth, as evidenced by insignificant coefficient estimates on those variables in the change model. The lack of significance of work schedule in the change model coupled with the failure of IV models run on this data to obtain significant coefficient estimates for those variables support the notion that non-traditional work schedule, although negatively correlated with quantity levels, may be endogenous to child care availability.[6] Not surprisingly given the likelihood that parents select care settings near their place of employment, counties in which workers spend more time commuting to work boasted lower levels of child care quantity in 1990 and 2000, although the relationship is not significant in the change model.

Also highly correlated with county child care quantity levels are variables that in part proxy for the availability of alternative in-home care options (e.g., father care or relative care). Specifically, counties with higher levels of co-habitating married couples have lower levels of care quantity (although there is no significant impact on quantity

[6] Note that recent research (Kimmel and Powell, 2001) supports the existence of a true exogenous schedule effect.

expansion). In addition, in 1990, counties with more mother-child subfamilies also exhibited lower quantities of care. Unfortunately, a similar variable was not available in 2000. Finally, although admittedly a weak proxy for kith and kin care alternatives, the proportion of county residents born in the state of current residence (and thus more likely to be proximate to extended family and friends) is inversely related to quantity of care in 1990 and 2000, and marginally significant in the 2000 regression.

Race/ethnicity variables in the form of "proportion linguistically isolated" for various language groups[7] are included to control for the mutually-reinforcing effects of potentially-enhanced informal child care supply and a reduced level of formal child care demand among some groups. In 1990 and the change model, counties with larger and/or growing proportions of foreign born persons have significantly lower formal care quantity and boast less expansion in that quantity. Similarly, in all three models, counties with larger linguistically-isolated Spanish speaking populations also had lower levels of care quantity and care quantity expansion. This finding is consistent with other studies noting a preference towards kith and kin care among Hispanics (Brown-Lyons *et al*, 2001). It is also consistent with the hypothesis that the potential availability of unpaid informal care may dampen formal, paid quantity expansion.

Finally, various child care quality regulations were alternately significant in the 1990 and 2000 models, although their potential to impact both supply and demand in the child care market makes interpretation of the results problematic. Other center cost

[7] Alternative models with both "linguistic isolation" and more standard race/ethnicity variables were compromised by a high degree of multicollinearity between the variables. Alternative models that included only standard race/ethnicity variables provided results similar to those contained here. Namely, counties with a high proportion of Hispanic residents exhibited significantly lower child care quantity in 1990 and 2000, although the effect was not significant in the change equation. No similar statistically significant pattern was observed for other racial/ethnic groups.

drivers, namely child care worker wage and median contract rent, presented mixed results. The latter entered negatively in all models, indicating that counties with high and/or rising rental costs exhibit lower levels of child care quantity and expansion. The former, although insignificant in the 1990 model, entered positively and significantly into the 2000 and change models, consistent with the hypothesis that actual (as opposed to regulated) teacher quality may enhance child care quantity through demand channels. [8] The presence of a "U-shaped" relationship between income levels and child care availability is significantly supported in the data only in 1990.

IV.2 Rural-Urban Differences (Table 5)

Many authors have noted the unique obstacles faced by rural counties in their attempts to combat poverty through female employment, including low levels of human capital, inadequate access to transportation, a lack of availability of quality jobs for low skilled workers, and inadequate support services for working mothers, including child care (Weber et al, 2002). Interestingly, as shown in Table 3a, child care quantity expansion was most variable in rural counties. Exploiting that variation and attempting to identify different drivers for child care expansion in rural settings, I ran separate models for "urban or urbanized" (Beale Codes 0-5), "less urbanized or rural" (Beale Codes 6-9), "strictly urban" (Beale Codes 0-3), and "strictly rural" (Beale Codes 8-9) counties.

As exhibited in Table 5, increases in female labor force participation appear to act as a stimulant to child care expansion in all county types. However, relative to

[8] Results were consistent across separate models alternately using Census special tabulation wage data and public use County Business Pattern wage data. Census special tabulation wage data was used in the remaining models due to a large number of missing values on the CBP wage data. However, due to an incompatibility between 1990 and 2000, special tabulation wage change data could not be used.

urban/urbanized counties (column 1), child care quantity expansion in less urbanized/rural counties (column 2) responds more dramatically to policy levers. Specifically, such expansion in less urbanized/rural counties is slightly more responsive to spending (6 providers per 1000 children versus 5) and significantly more hindered by increased levels of Head Start spending (21 providers per 1000 children versus 4) – evidence of the substitution effect discussed earlier, perhaps due to constraints in the labor pool. In addition, removal of extended transitional child care benefits significantly dampens expansion while increases in the generosity of tax policy promotes expansion in less urbanized / rural counties but not in urban/urbanized counties.

These distinctions are even more prominent when one compares "strictly urban" (column 3) and "strictly rural" (column 4) counties. In the latter, the coefficient values on all policy levers are significantly larger in magnitude than in the former. For example, a similar expansion in direct child care spending in rural counties has a three times larger impact than it would in urban counties. Similarly, urban counties in states with an expanded tax policy would experience no net expansion of child care quantity, while rural counties in those states would, on average, experience an increase of 14.5 providers per 1,000 pre-school aged children.

IV.3 Differences by Level of County Affluence (Table 6)

Given the difference in the distribution of county level child care expansion between rich and poor counties noted in Table 3b, I estimated separate models for counties with average family income above and below the sample median in the given year (the average median family income for 1990 and 2000 served as the threshold for the change model). Not surprisingly, although child care expansion in both more and less

affluent counties responded to changes in female employment, policy changes had a larger and more significant impact in the latter. Specifically, while child care spending appeared to promote expansion across the board, a similar dollar increase per pre-school aged child in poverty generated a 2.7 times larger expansion in child care quantity in poor than affluent counties. Finally, expansion of refundable tax credits (aimed at the working poor) enhanced child care quantity only in poorer counties, while removal of extended transitional child care benefits reduced child care quantity only in those counties.

Section VI: Conclusions and Policy Implications

The period 1990 to 2000 witnessed a large influx of women into the labor market, both as part of a continuing trend and as the direct result of the mid-decade welfare reform legislation. Given a general awareness of the importance of adequate child care availability in supporting this increase in female employment, the decade also boasted a significant expansion in policy aimed at promoting child care quantity and quality through direct and indirect subsidies to parents and providers. However, many have observed actual expansion in child care quantity supplied at the local level to have been highly variable across regions and generally sluggish over the period.

As such, understanding the key drivers of actual child care expansion at the local level, as well as the extent to which such drivers differ by county characteristics such as county affluence, rural/urban status, and informal child care availability, is important. Specifically, if rising female employment rates and child care subsidization (for all income levels) is failing to generate an adequate expansion in the quantity of formal care to meet the needs of the population, then remediation is warranted.

Evidence generated in this paper supports the hypothesis that market forces have produced theoretically-predicted impacts in the child care market. The expansion of female employment over the decade of the 1990's is associated with an additional 2.4 child care workers per 1,000 pre-school aged children or approximately 10% of the actual quantity increase. In addition, targeted policy levers appear also to have influenced child care availability over the period. Specifically, the $1,591 increase in spending per child in poverty generated approximately 33% of the total increase in child care workers per child (8 child care workers per 1,000 pre-school aged children), expansion of the child care tax credit yielded just under 15% of the increase (3.3 child care workers per 1,000 pre-school aged children), and removal of extended transitional child care benefits in some states resulted in a decrease of 6.5 child care workers per 1,000 pre-school aged children.

Further, it appears that these market and policy forces had differential impacts based upon county type, with rural and less affluent localities having been more sensitive to policy interventions than their more urban and/or affluent counterparts. Specifically, a similar dollar expansion in direct subsidy spending generated a three times larger quantity expansion in rural and a 2.7 times larger quantity expansion in poor communities than it did in urban and affluent communities, respectively. Tax policy expansion expanded care significantly only in rural and/or poor communities, and the removal of extended transitional child care negatively affected care levels only in poor communities.

These results speak directly to policy makers. According to this analysis, efforts over the decade to expand child care availability through tax credits and spending initiatives have been responsible for nearly half of the growth in quantity, as compared to

the 10% generated by expansion in female labor force participation. The approximately $5.5 billion increase in total real direct spending alone has been responsible for the generation of nearly 175,000 new child care workers, at an annual cost of just over $3,000 per worker. In contrast, removal of extended transitional child care has worked to reduce overall supply. The child care market has been and is likely to continue to be sensitive to policy intervention, with the most "neediest" areas (i.e., rural and poor counties) responding most significantly. Ongoing policy intervention in the child care market is essential to maintaining appropriate levels of care to support working parents and their children in the decades to come.

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Table 1: Selected Sample Descriptive Statistics by Year

	1990		2000		Change 2000-1990[b]	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Providers per Child <6	.05	.02	.08	.03	.02	.03
Min. Providers per Child	.00		.02		-.13	
Max. Providers per Child	.23		.37		.24	
Total Providers	361.5	1,032.4	583.5	1,551.7	169.2	538.8
Min. Total Providers	2		20		-424	
Max .Total Providers	27357		41880		14523	
Proportion of Providers w/HS Degree or More	0.80	0.15	0.84	0.10	0.08	0.42
Proportion of Providers w/College Degree or More	0.17	0.12	0.19	0.10	0.05	0.29
Lagged Proportion Females Employed	0.59	0.08	0.61	0.07	0.02	0.03
Proportion Females Working Year-round, Full Time	0.25	0.06	0.30	0.05	0.04	0.03
Proportion Population Foreign Born	0.02	0.04	0.03	0.05	0.01	0.02
Proportion Population Spanish Isolated	0.01	0.03	0.01	0.02	0.00	0.01
Proportion Population Asian Isolated	0.00	0.00	0.00	0.00	0.00	0.00
Proportion Population Other Isolated	0.00	0.01	0.00	0.01	0.00	0.00
Proportion Population White Non-Hispanic	0.85	0.18	0.81	0.19	-0.03	0.04
Proportion Population Black Non-Hispanic	0.08	0.14	0.09	0.14	0.00	0.02
Proportion Population Hispanic	0.04	0.11	0.05	0.11	0.02	0.03
Child Care Center Worker Earnings (1990 $,000)[a]	0.21	0.13	0.17	0.05		
Family Home Wrkr Earnings (1990$,000)	0.12	0.80				
County Business Pattern Child Care Wage (1990$)	6.94	1.18	5.90	5.04	-2.79	3.34
Teacher Education Req'd (yrs/10)	0.71	0.62	0.91	0.56	0.20	0.44
Ongoing Teacher Education (hrs/10)	0.82	1.07	1.23	0.97	0.39	0.52
Infant Child:Teacher Ratio Req'd	4.91	1.11	4.51	0.74	-0.43	0.72
Child Care Spending per Child in Poverty	0.10	0.05	1.73	0.83	1.59	0.81
Head Start Spending per Child in Poverty	0.07	0.06	0.78	0.17	0.70	0.15
Extended Transitional Child Care Provided	0.03	0.17	0.26	0.44		
Any Transitional Child Care Provided	1.00	0.00	0.53	0.50		
State Provides Refundable Tax Credit	0.05	0.23	0.21	0.41		
State Provides Non-refundable Tax Credit	0.27	0.45	0.20	0.40		
Proportion population Public Assistance	0.08	0.04	0.03	0.02	-0.05	0.03
Sample Size	2470		2532		2622	

[a.] 2000 figures represent combination of center and family home workers.

[b.] Note that figures deviate from actual column differences due to differences in sample size.

Table 2a: Selected Descriptive Statistics by Rural-Urban Status, 1990

	Urban, urbanized (0-5)		Less Urbanized,Rural (6-9)		Strictly Urban (0-3)		Strictly Rural (8-9)	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Providers per Child <6	0.05	0.02	0.05	0.02	0.05	0.02	0.05	0.03
Proportion Providers with High School Education	0.83	0.09	0.79	0.17	0.82	0.09	0.78	0.19
Proportion Providers with College Education	0.20	0.10	0.15	0.13	0.21	0.10	0.14	0.15
Lagged Proportion Females Employed	0.62	0.07	0.56	0.07	0.63	0.07	0.55	0.08
Proportion Females Working Year Round, Full-Time	0.28	0.05	0.23	0.05	0.29	0.05	0.22	0.05
Proportion Population Foreign Born	0.04	0.05	0.02	0.02	0.04	0.05	0.01	0.02
Center Care Worker Earnings (1990 $,000)	0.20	0.07	0.21	0.16	0.20	0.07	0.23	0.20
Family Home Care Worker Earnings (1990$,000)	0.12	0.06	0.12	0.09	0.13	0.06	0.12	0.09
County Business Pattern Child Care Worker Wage (1990 $)	7.20	1.53	6.78	0.88	7.34	1.56	6.87	0.63
Child Care Spending per Child in Poverty	0.11	0.05	0.10	0.05	0.11	0.05	0.09	0.05
Head Start Spending per Child in Poverty	0.07	0.04	0.08	0.07	0.07	0.04	0.08	0.07
Extended Transitional Childcare Provided	0.03	0.17	0.03	0.17	0.03	0.16	0.03	0.18
Refundable Tax Credits	0.04	0.20	0.06	0.24	0.03	0.18	0.06	0.24
Non-refundable Tax Credits	0.30	0.46	0.26	0.44	0.29	0.46	0.20	0.40
Proportion Population HS/GED	0.51	0.06	0.51	0.07	0.51	0.06	0.51	0.07
Proportion Population College Grad	0.24	0.08	0.16	0.06	0.24	0.09	0.15	0.06
Proportion Households Public Assistance	0.07	0.03	0.09	0.05	0.07	0.03	0.10	0.05
Median Family Income (1990 $,000)	34.19	7.46	25.81	4.95	35.38	7.64	24.54	4.86
Sample Size	929		1541		723		486	

Table 2b: Selected Descriptive Statistics by Rural-Urban Status, 2000

	Urban, urbanized (0-5)		Less Urbanized,Rural (6-9)		Strictly Urban (0-3)		Strictly Rural (8-9)	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Providers per Child <6	0.08	0.02	0.08	0.03	0.07	0.02	0.09	0.04
Proportion of Child Care Workers with High School ed.	0.85	0.07	0.84	0.12	0.85	0.07	0.84	0.13
Proportion of Child Care Workers with College ed.	0.22	0.09	0.18	0.11	0.22	0.09	0.18	0.12
Lagged Proportion Females Employed	0.64	0.06	0.59	0.07	0.64	0.06	0.58	0.07
Proportion Females Working Year Round, Full-Time	0.32	0.05	0.28	0.05	0.33	0.05	0.27	0.05
Proportion Population Foreign Born	0.05	0.06	0.02	0.03	0.06	0.06	0.02	0.02
Child Care Worker Earnings (1990 $,000)	0.19	0.04	0.16	0.06	0.19	0.04	0.16	0.06
County Business Pattern Child Care Wage (1990 $)	4.25	2.36	7.04	6.00	3.99	2.19	6.86	5.58
Child Care Spending per Child in Poverty	1.77	0.81	1.70	0.85	1.78	0.80	1.72	0.85
Head Start Spending per Child in Poverty	0.76	0.15	0.80	0.18	0.76	0.15	0.83	0.17
Extended Transitional Childcare Provided	0.26	0.44	0.26	0.44	0.27	0.44	0.24	0.43
Any Transitional Child Care Provided	0.59	0.49	0.48	0.50	0.60	0.49	0.40	0.49
State Provides Refundable Tax Credit	0.18	0.39	0.22	0.42	0.17	0.38	0.24	0.43
State Provides Non-refundable Tax Credit	0.23	0.42	0.19	0.39	0.23	0.42	0.13	0.34
Proportion Population HS/GED	0.53	0.07	0.56	0.06	0.53	0.07	0.58	0.06
Proportion Population College Grad	0.28	0.09	0.19	0.06	0.28	0.10	0.18	0.06
Proportion Households Public Assistance	0.03	0.02	0.04	0.02	0.03	0.01	0.04	0.03
Median Family Income (1990 $,000)	37.43	8.14	29.48	5.05	38.78	8.37	28.36	4.94
Sample Size	1036		1496		802		415	

Table 2c: Selected Descriptive Statistics by Rural-Urban Status, Change 2000-1990

	Urban,Urbanized (0-5)		Less Urbanized,Rural (6-9)		Strictly Urban (0-3)		Strictly Rural (8-9)	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Providers per Child <6	0.02	0.02	0.03	0.03	0.02	0.02	0.03	0.04
Proportion Providers with HS education or More	0.02	0.09	0.11	0.52	0.02	0.09	0.23	0.82
Proportion Providers with College Education or More	0.02	0.09	0.07	0.36	0.02	0.08	0.14	0.55
Lagged Proportion Females Employed	0.02	0.03	0.02	0.04	0.02	0.03	0.02	0.04
Proportion Females Working Year Round, Full-Time	0.04	0.02	0.05	0.03	0.04	0.02	0.05	0.04
Proportion Population Foreign Born	0.02	0.02	0.01	0.02	0.02	0.02	0.01	0.02
County Business Pattern Child Care Wage (1990 $)	-3.53	2.63	-2.39	3.61	-3.78	2.71	-2.82	0.36
Child Care Spending per Child in Poverty	1.66	0.77	1.55	0.84	1.66	0.76	1.53	0.82
Head Start Spending per Child in Poverty	0.70	0.14	0.70	0.16	0.70	0.14	0.71	0.15
Proportion Population HS/GED	0.02	0.03	0.06	0.04	0.02	0.04	0.06	0.04
Proportion Population College Grad	0.04	0.02	0.03	0.02	0.05	0.02	0.03	0.03
Proportion Households Public Assistance	-0.04	0.02	-0.06	0.04	-0.04	0.02	-0.06	0.05
Median Family Income (1990 $,000)	3.48	2.48	3.56	2.35	3.67	2.59	3.71	2.58
Sample Size	931		1691		725		585	

Table 3a: Distribution Information on "Change in Providers per Child" by County Rural-Urban Status

	Urban, Urbanized (0-5)	Less Urbanized, Rural (6-9)	Strictly Urban (0-3)	Strictly Rural (8-9)
Variable Mean	.022	.025	.022	.026
10th Percentile	.002	-.010	.003	-.017
50th Percentile	.022	.025	.022	.026
90th Percentile	.043	.061	.041	.070
Sample Size	931	1691	725	585

Table 3b: Distribution Information on "Change in Providers per Child" by County Median Family Income Status

	County Median Family Income Less Than Sample Median	County Median Family Income Greater Than Sample Median
Variable Mean	.025	.023
10th Percentile	-.008	-.002
50th Percentile	.024	.023
90th Percentile	.060	.049
Sample Size	1271	1351

Table 4: OLS Regression Results (Dependent Variable=Providers per Child)

	1990	2000	Change 2000-1990
Policy Variables			
Child Care Spending per Child in Poverty	0.012 (0.009)	0.003** (0.001)	0.005*** (0.001)
Head Start Spending per Child in Poverty	-0.026*** (0.007)	-0.006* (0.003)	-0.013* (0.006)
Extended Transitional Child Care Provided [a]	-0.016*** (0.003)	0.005*** (0.001)	0.002 (0.001)
Extended Transitional Child Care Dropped [b]			-0.007* (0.003)
Any Transitional Child Care Provided [c]		-0.003* (0.001)	0.003* (0.001)
State Provides Refundable Tax Credit [d]	-0.001 (0.002)	0.009*** (0.001)	0.003* (0.002)
State Provides Non-refundable Tax Credit	0.002* (0.001)	0.000 (0.001)	
Work / Schedule Variables			
Lagged Proportion Females Employed	0.044*** (0.011)	0.126*** (0.016)	0.120*** (0.032)
Proportion Females Working Year-round, Full Time	0.096*** (0.015)	-0.014 (0.020)	-0.039 (0.035)
Proportion Females Working Evening Shift	-0.049* (0.023)	-0.085** (0.028)	-0.016 (0.031)
Proportion Females Working Afternoon Shift	-0.096*** (0.024)	-0.180*** (0.039)	-0.005 (0.041)
Mean Travel Time to Work (in Minutes)	-0.003* (0.001)	-0.006*** (0.001)	0.000 (0.000)
Proxies for Kith/Kin Care Alternatives			
Proportion Females Married, Spouse present	-0.036*** (0.011)	-0.028* (0.012)	-0.043 (0.036)
Proportion Population Born in State of Current Residence	-0.003 (0.004)	-0.007* (0.005)	0.023 (0.022)
Proportion of Households w/ Mother-Child Sub-family	-0.923*** (0.192)		
Proportion Population Foreign Born	-0.074*** (0.020)	-0.018 (0.022)	-0.114** (0.041)
Proportion Population Spanish Isolated	-0.035* (0.019)	-0.096** (0.032)	-0.112* (0.051)
Proportion Population Asian Isolated	0.197 (0.130)	0.150 (0.142)	-0.379 (0.311)
Proportion Population Other Isolated	-0.035 (0.053)	-0.116* (0.055)	-0.086 (0.198)

Table 4, continued: OLS Regression Results (Dependent Variable=Providers per Child)

	1990	2000	Change 2000-1990
Cost / Regulation Drivers			
Median Rent per Room (1990 $)	-0.042*** (0.010)	-0.089 (0.014)	-0.045* (0.022)
Child Care Worker Earnings (1990 $)	-0.005 (0.003)	0.017 (0.012)	
Teacher Education Req'd	-0.007*** (0.001)	-0.001 (0.001)	-0.001 (0.000)
On-going Teacher Education Req'd	0.001*** (0.000)	-0.001 (0.001)	0.004** (0.001)
Infant Child:Teacher Ratio Req'd	-0.004*** (0.000)	-0.006 (0.001)	0.002 (0.001)
Number Annual Inspections Req'd	-0.001* (0.000)	-0.001 (0.001)	0.001 (0.001)
Socio-Demographic Variables			
Proportion population with HS Degree/GED	-0.007 (0.010)	0.038** (0.013)	0.011 (0.024)
Proportion population with College Degree	0.063*** (0.012)	0.080*** (0.017)	0.037 (0.040)
Proportion population on Public Assistance	-0.099*** (0.019)	-0.019 (0.040)	-0.033* (0.020)
Median Family Income	-0.001** (0.000)	0.000 (0.001)	-0.001 (0.000)
Median Family Income Squared	0.000* (0.000)	0.000 (0.000)	0.000 (0.000)
Constant	0.105*** (0.013)	0.077*** (0.015)	0.023*** (0.005)
Adjusted R-square	0.430	0.396	0.080
Sample Size	2470	2532	2622

[a.] For change model, variable=1 if the county began providing extended transitional child care.
[b.] For change model, variable=1 if the county stopped providing extended transitional child care.
[c.] For change model, this variable=1 if county stopped providing any transitional child care.
[d.] For change model, this variable=1 if county expanded tax code generosity.
Note: All standard errors robust to heteroskedasticity. *:p<.10, **:p<.01, ***:p<.001.
Additional controls for region included in 1990 and 2000 models.

Table 5: Selected Results from Change Model by County Rural-Urban Status

	Urban, Urbanized (0-5)		Less Urbanized, Rural (6-9)		Strictly Urban (0-3)		Strictly Rural (8-9)	
	Estimate	Std Error	Estimate	Std Error	Estimate	Std Error	Estimate	Std Error
Lagged Proportion Females Employed	.109**	.038	.135***	.039	.129***	.039	.154*	.068
Child Care Spending per Child in Poverty	.005***	.001	.006***	.002	.004**	.001	.013***	.004
Head Start Spending per Child in Poverty	-.004	.007	-.021*	.009	-.003	.007	-.041*	.022
Extended Transitional Child Care Dropped	.002	.003	-.011**	.004	.003	.004	-.018*	.009
Extended Transitional Child Care Initiated	-.001	.001	.003	.002	.001	.002	.001	.006
Transitional Child Care Dropped	.001	.002	.005*	.002	-.000	.002	.007*	.004
Tax Code Generosity Expanded	.000	.002	.005*	.002	.000	.002	.015**	.006
Constant	.020***	.006	.028***	.007	.017**	.007	.018	.016
Adjusted R-square	0.169		0.071		0.189		0.099	
Sample Size	931		1692		725		585	

Note: All standard errors robust to heteroskedasticity. *:p<.10, **:p<.01, ***:p<.001.

Table 6: Selected Results from Change Model by County Median Family Income Status

	County Median Family Income Less Than Sample Median		County Median Family Income Greater Than Sample Median	
	Estimate	Std Error	Estimate	Std Error
Lagged Proportion Females Employed	.133***	.040	.087*	.051
Child Care Spending per Child in Poverty	.008***	.002	.003*	.002
Head Start Spending per Child in Poverty	-.022*	.012	-.011	.008
Extended Transitional Child Care Dropped	-.020**	.007	-.002	.003
Extended Transitional Child Care Initiated	.001	.003	.001	.002
Transitional Child Care Dropped	.004	.003	.002	.002
Tax Code Generosity Expanded	.006*	.003	.002	.002
Constant	.030***	.008	.019*	.007
Adjusted R-square	0.074		0.129	
Sample Size	1272		1351	

Note: All standard errors robust to heteroskedasticity. *:p<.10, **:p<.01, ***:p<.001.

Appendix Table 1: Description of Variables

Variable	Description
Providers per Pre-School Aged Child	Total number of county residents employed in industry 862 (child day care services) or 863 (family child care homes) in 1990 or in industry 847 (child day care services) in 2000[9] divided by total number of children in county less than age 6.[A]
Total Providers	Total number of county residents employed in industry 862 (child day care services) or 863 (family child care homes) in 1990 or in industry 847 (child day care services) in 2000.[A]
Proportion of Providers w/HS Degree or More	Proportion of those employed in child care industry with a high school diploma, GED, AA, BA, MA, Ph.D. or other advanced degree. [A]
Proportion of Providers w/College Degree or More	Proportion of those employed in child care industry with AA, BA, MA, Ph.D. or other advanced degree. [A]
Lagged Proportion Females Employed	Proportion of county female residents aged 16+ who worked (any number of hours) in previous year (1989 or 1999). [B]
Lagged Proportion Females Employed Year-Round, Full Time	Proportion of county female residents aged 16+ who worked 35+ hours per week, 50-52 weeks in previous year (1989 or 1999). [B]
Proportion Working Evening Shift	Proportion of county residents aged 16+ who left for work between 4:00 P.M. and 4:59 A.M. [B]
Proportion Working Afternoon Shift	Proportion of county residents aged 16+ who left for work between 12:00 P.M. and 3:59 P.M. [B]
Mean Travel Time to Work	Average commuting time in tens of minutes for workers in county not working in own home. [B]
Proportion Females Married, Spouse present	Proportion of females aged 15+ currently married with spouse present. [B]
Proportion Population Born in State of Current Residence	Proportion of county residents born in state of current residence. [B]
Proportion of Households w/ Mother-Child Sub-family	Number of mother-child subfamilies relative to the county population. [B]
Proportion Population Foreign Born	Proportion of county residents foreign born. [B]
Proportion Population Spanish Isolated	Proportion of county households linguistically isolated by Spanish language. [B]
Proportion Population Asian Isolated	Proportion of county households linguistically isolated by Asian language. [B]
Proportion Population Other Isolated	Proportion of county households linguistically isolated by Other language. [B]

[9] Note that the U.S. Census supports a continuous crosswalk for these industry codes between 1990 and 2000.

Appendix Table 1, continued: Description of Variables

Proportion Population White Non-Hispanic	Proportion of county residents with race=White, not of Hispanic origin. [B]
Proportion Population Black Non- Hispanic	Proportion of county residents with race=Black, not of Hispanic origin. [B]
Proportion Population Hispanic	Proportion of county residents with race=Any, of Hispanic origin. [B]
Proportion Population Other	Proportion of county residents with race=Asian, Pacific Islander, American Indian, Eskimo or Aleut, not of Hispanic origin. [B]
Median Rent per Room (1990 $)	Median gross rent among renter occupied housing units in county (in constant 1990$,000). [B]
Child Care Worker Earnings (1990 $)	Median annual earnings divided by average weekly hours worked for county residents employed in industry 862 (child day care services) in 1990 (in constant 1990 $,000). [A]
Family Home Worker Earnings (1990 $)	Median annual earnings divided by average weekly hours worked for county residents employed in industry 863 (family child care homes) in 1990 (in constant 1990 $,000). [A]
Child Care Worker Earnings 847 (1990 $)	Median annual earnings divided by average weekly hours worked for county residents employed in industry 847 (child day care services) in 2000 (in constant 1990 $,000). [A]
County Business Pattern Child Care Wage (1990 $)	Total annual payroll divided by total number of mid-March employees divided by 2000 hours per year for SIC=8350 (in constant 1990 $). [C]
Teacher Education Req'd	State mandated minimum educational attainment (in years/10) for a child care center teacher (in 1986 and 1996). [D]
On-going Teacher Education Req'd	Sate mandated minimum (in hours/10) of ongoing training required for a child care center teacher (in 1986 and 1996). [D]
Infant Child:Teacher Ratio Req'd	State mandated maximum number of infants <12 months per child care center caregiver (in 1990 and 1998). [D,E]
Number Annual Inspections Req'd	State mandated total number of annual inspections of a day care center to be conducted by the licensing agency (in 1986 and 1996). [D]
Child Care Spending per Child in Poverty	Combined 1990 SSBG, 1991 Title IV-A and 1990 state initiated child care subsidy spending per child <6 in poverty in 1990. Combined 2000 SSBG, CCDF, TANF-transfer and state initiated child care subsidy spending per child <6 in poverty in 2000. (all in thousands of constant 1990 $) [F]

Appendix Table 1, continued: Description of Variables

Head Start Spending per Child in Poverty	Federal Head Start spending per child <6 in poverty in 1990 and 2000. (all in thousands of constant 1990 $). [G]
Extended Transitional Child Care Provided	Indicator variable set equal to 1 if state provided transitional child care beyond 12 months. [H,I]
Any Transitional Child Care Provided	Indicator variable set equal to 1 if state provided any transitional child care in given year. [I]
State Provides Refundable Tax Credit	Indicator variable set equal to 1 if state tax code includes refundable tax credit for child care expenses. [J]
State Provides Non-Refundable Tax Credit	Indicator variable set equal to 1 if state tax code includes non-refundable tax credit for child care expenses. [J]
Proportion population with HS Degree/GED	Proportion of county residents aged 25+ with high school diploma or GED. [B]
Proportion population with College Degree	Proportion of county residents aged 25+ with AA., BA., or advanced / professional degree. [B]
Proportion population on Public Assistance	Proportion of households in 1990 who reported public assistance income in 1989. [B]
Median Family Income	County median family income in 1989 (in thousands of constant 1990 $). [B]
Rural_Urban Continuum Codes	Rural=Beale Codes 8-9 Less Urbanized=Beale Codes 6-7 More Urbanized=Beale Codes 4-5 Urban=Beale Codes 0-3. [K]
County Area	County area in square miles. [L]
Proportion Retail	Proportion of total county employees employed in retail sector (in 1989 and 1995). [M]
Proportion Service	Proportion of total county employees employed in service sector (in 1989 and 1995). [M]
Proportion Manufacturing	Proportion of total county employees employed in manufacturing sector (in 1989 and 1995). [M]
County Average Wage (1990 $)	Total 1989 annual payroll divided by total number of mid-March employees divided by 2000 hours per year for all industries in county (in constant 1990 $). [N]

Data Sources

A: Special Tabulations of the 1990 and 2000 U.S. Census of Population and Housing

B: 1990 and 2000 U.S. Census Public Use Files SFT-3

C: U.S. Census County Business Pattern Data public use files

D: State Child Care Regulation Database compiled by Jane Arnold and Joseph Hotz

E: The Center for Career Development in Early Care and Education, Wheelock College

F: 1990 data: 1994Greenbook (available online at www.aspe.hhs.gov/94gb/sec12.txt); "State Investments in Child Care and Early Childhood Education," Children's Defense Fund.

2000 Data: "Child Care: Funding and Spending Under Federal Block Grants, 3/02," CRS Report for Congress; Administration for Children and Families report on SSBG child care allocations (available online at www.acf.hhs.gov/programs/ocs/ssbg/docs/cdcfocus00.htm)
G: 1989 Data: Head Start Information and Publication Center. 1999 Data: Head Start Bureau publication (available online at www.acf.hhs.gov/programs/hsb/research/factsheets/00_hsfs.htm)
H: Welfare Waiver Database compiled by Ann Rose Horvath from US DHHS, Urban Institute, and Hudson Institute data.
I: State Policy Documentation Project database, a joint project of the Center on Law and Social Policy (CLASP) and the Center on Budget and Policy Priorities (CBPP), (available online at http://www.spdp.org/tanf/ccafterwelfare.PDF)
J: "Making Care Less Taxing" from National Women's Law Center, various years.
K: Economic Research Service (ERS) of the UDSA (available online at http://www.ers.usda.gov/Data/RuralUrbanContinuumCodes/)
L: U.S. Census, 1990 (Table available online at: http://www.census.gov/population/censusdata/90den_stco.txt)
M: USA Counties Database, 1998 (CD-ROM)
N: U.S. Bureau of Labor Statistics (CD-ROM)

Appendix Table 2a : Two Stage Least Squares Regression Results, First Stage (Dependent Variable=Lagged Proportion Females Working)

	1990		2000		Change 2000-1990	
	Estimate	Std Error	Estimate	Std Error	Estimate	Std Error
Average County Wage, 1989 (instrument)	*-0.007***	*0.001*	*-0.006***	*0.000*	*-0.002***	*0.001*
Proportion Females Working Year-round, Full Time	0.691***	0.020	0.648***	0.016	0.594***	0.019
Proportion Females Working Evening Shift	0.174***	0.039	0.301***	0.031	0.060*	0.026
Proportion Females Working Afternoon Shift	0.241***	0.043	0.160***	0.039	0.009	0.032
Mean Travel Time to Work (in Minutes)	-0.002***	0.000	-0.002***	0.000	0.000	0.000
Proportion Females Married, Spouse present	-0.018	0.019	-0.095***	0.014	-0.018	0.022
Proportion Population Born in State of Current Residence	0.001	0.007	-0.013*	0.006	0.019	0.017
Proportion of Households w/ Mother-Child Sub-family	0.362	0.304				
Proportion Population Foreign Born	-0.042	0.041	-0.157***	0.031	0.011	0.036
Proportion Population Spanish Isolated	0.252***	0.038	0.444***	0.048	-0.084	0.053
Proportion Population Asian Isolated	0.965**	0.312	0.464*	0.189	-0.125	0.312
Proportion Population Other Isolated	0.131	0.088	0.197*	0.079	-0.179	0.130
Median Rent per Room (1990 $)	0.000	0.000	0.000	0.000	0.000	0.000
Child Care Worker Earnings (1990 $)	-0.000*	0.000	-.000***	0.000		
Teacher Education Req'd (yrs/prop)	-0.000**	0.000	0.000***	0.000	-.001***	0.000
On-going Teacher Education Req'd	-.000***	0.000	0.000***	0.000	0.000	0.000
Infant Child:Teacher Ratio Req'd	-0.000	0.001	0.005***	0.001	-0.001	0.001
Number Annual Inspections Req'd	0.001	0.001	0.002	0.001	-.004***	0.001
Child Care Spending per Child in Poverty	-.079***	0.017	0.003**	0.001	0.002*	0.001
Head Start Spending per Child in Poverty	-0.039**	0.014	0.013**	0.004	0.026***	0.005
Extended Transitional Child Care Provided [a]	0.034***	0.005	-0.004*	0.002	-.006***	0.001
Extended Transitional Child Care Dropped [b]					-0.005	0.003
Any Transitional Child Care Provided [c]			0.002	0.002	-0.003*	0.001

Appendix Table 2a, continued : Two Stage Least Squares Regression Results, First Stage
(Dependent Variable=Lagged Proportion Females Working)

	1990		2000		Change 2000-1990	
	Estimate	Std Error	Estimate	Std Error	Estimate	Std Error
State Provides Refundable Tax Credit [d]	0.038***	0.004	-0.001	0.002	-0.002	0.001
State Provides Non-refundable Tax Credit	-0.001	0.002	-0.001	0.002		
Proportion population with HS Degree/GED	0.080***	0.018	0.109***	0.017	0.100***	0.019
Proportion population with College Degree	0.391***	0.020	0.355***	0.018	0.119***	0.028
Proportion population on Public Assistance	-0.010	0.034	0.279***	0.040	-.094***	0.018
Median Family Income	0.011***	0.001	0.011***	0.001	0.002***	0.000
Median Family Income Squared	0.000***	0.000	0.000***	0.000	0.000***	0.000
Population Density	0.000***	0.000	0.000***	0.000		
Urban Fringe	0.029***	0.005	0.017***	0.004		
Urban, Population 250,000-999,999	0.012**	0.004	0.002	0.003		
Urban, Population Less Than 250,000	0.012**	0.004	0.007*	0.004		
Urbanized, Adjacent	0.019	0.005	0.008*	0.004		
Urbanized, Non-adjacent	0.022	0.005	0.012**	0.004		
Less Urbanized, Adjacent	0.030	0.004	0.018	0.003		
Less Urbanized, Non-adjacent	0.035	0.004	0.021	0.004		
Rural, Adjacent	0.042	0.005	0.034	0.004		
Rural, Non-adjacent	0.049	0.005	0.035	0.004		
Constant	0.142	0.024	0.082	0.019	-0.041	0.004
Adjusted R-square	*0.821*		*0.843*		*0.467*	
Sample Size	2467		2529		2614	

[a.] For change model, variable=1 if the county began providing extended transitional child care.
[b.] For change model, variable=1 if the county stopped providing extended transitional child care.
[c.] For change model, this variable=1 if county stopped providing any transitional child care.
[d.] For change model, this variable=1 if county expanded tax code generosity.
Note: All standard errors robust to heteroskedasticity. *:p<.10, **:p<.01, ***:p<.001.

Appendix Table 2b: Two Stage Least Squares Selected Regression Results, Second Stage (Dependent Variable= Providers per Child<6)

	1990		2000		Change 2000-1990	
	Estimate	Std Error	Estimate	Std Error	Estimate	Std Error
Predicted Lagged Proportion Females Working	*0.138***	*0.043*	*0.327***	*0.060*	*0.859***	*0.403*
Proportion Females Working Evening Shift	0.025	0.033	-.147***	0.042	-0.482	0.241
Proportion Females Working Afternoon Shift	-0.064***	0.024	-0.141***	0.035	-0.067	0.050
Proportion Females Working Year-round, Full Time	-0.111	0.027	-0.212***	0.040	-0.011*	0.050
Mean Travel Time to Work (in Minutes)	0.000	0.000	0.000	0.000	0.000	0.000
Proportion Females Married, Spouse present	-0.036**	0.011	-0.017	0.013	-0.037	0.042
Proportion Population Born in State of Current Residence	-0.004	0.004	-0.004	0.005	0.002	0.027
Proportion of Households w/ Mother-Child Sub-family	-0.943***	0.193				
Proportion Population Foreign Born	-0.067***	0.020	0.024	0.028	-0.112*	0.054
Proportion Population Spanish Isolated	-0.060**	0.021	-0.197***	0.047	-0.055	0.079
Proportion Population Asian Isolated	0.184	0.138	0.097	0.136	-0.138	0.474
Proportion Population Isolated (other)	-0.045	0.052	-0.156	0.056	0.036	0.211
Median Rent per Room (1990 $)	-0.000***	0.000	-0.000***	0.000	-0.000*	0.000
Child Care Worker Earnings (1990 $)	0.000	0.000	0.000*	0.000		
Teacher Education Req'd (yrs/prop)	-0.001***	0.000	0.000	0.000	0.001*	0.000
On-going Teacher Education Req'd	0.001***	0.000	-0.000*	0.000	0.000*	0.000
Infant Child:Teacher Ratio Req'd	-0.004***	0.000	-0.007***	0.001	0.003*	0.001
Number Annual Inspections Req'd	-0.001*	0.000	-0.001	0.001	0.004*	0.002
Child Care Spending per Child in Poverty	0.022*	0.009	0.002*	0.001	0.004*	0.002
Head Start Spending per Child in Poverty	-0.022**	0.007	-0.009**	0.003	-0.033**	0.013
Extended Transitional Child Care Provided [a]	-0.020***	0.003	0.005***	0.001	0.007*	0.003
Extended Transitional Child Care Dropped [b]					-0.003	0.004
Any Transitional Child Care Provided [c]			-0.003*	0.001	0.006**	0.002

Appendix Table 2b: Two Stage Least Squares Selected Regression Results, Second Stage
(Dependent Variable= Providers per Child<6)

	1990		2000		Change 2000-1990	
	Estimate	Std Error	Estimate	Std Error	Estimate	Std Error
State Provides Refundable Tax Credit [d]	-0.004	0.003	0.008***	0.002	0.005**	0.002
State Provides Non-refundable Tax Credit	0.002*	0.001	0.001	0.001		
Proportion population with HS Degree/GED	-0.014	0.011	0.014	0.015	-0.064	0.052
Proportion population with College Degree	0.025	0.021	0.003	0.027	-0.054	0.065
Proportion population on Public Assistance	-0.092***	0.019	-0.067*	0.039	0.032	0.044
Median Family Income	-0.002***	0.001	-0.002*	0.001	-0.002*	0.001
Median Family Income Squared	0.000**	0.000	0.000*	0.000	0.000	0.000
Population Density	0.000**	0.000	-0.000***	0.000		
Urban Fringe	0.002	0.002	0.000	0.002		
Urban, Population 250,000-999,999	0.002	0.002	0.001	0.002		
Urban, Population Less Than 250,000	0.002	0.002	0.003	0.002		
Urbanized, Adjacent	0.002	0.002	0.002	0.002		
Urbanized, Non-adjacent	0.005*	0.003	0.003	0.003		
Less Urbanized, Adjacent	0.002	0.002	0.003	0.003		
Less Urbanized, Non-adjacent	0.002	0.003	0.003	0.003		
Rural, Adjacent	0.003	0.003	0.009*	0.004		
Rural, Non-adjacent	0.001	0.003	0.006*	0.004		
Constant	0.093***	0.014	0.071***	0.016	0.054**	0.017
Adjusted R-square	0.412		0.352			
Sample Size	2467		2529		2614	

[a.] For change model, variable=1 if the county began providing extended transitional child care.
[b.] For change model, variable=1 if the county stopped providing extended transitional child care.
[c.] For change model, this variable=1 if county stopped providing any transitional child care.
[d.] For change model, this variable=1 if county expanded tax code generosity.
Note: All standard errors robust to heteroskedasticity. *:p<.10, **:p<.01, ***:p<.001.