Understanding Churn: Predictors of Reentry Among Families Who Leave the Child Care Subsidy Program in Maryland

by[1]

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Abstract

Child care subsidies provide an important work support for low-income families, yet children often receive subsidies for only a short period of time and may cycle on and off the program. Much of the research to date on patterns of subsidy participation has focused on the duration of participation, and less attention has been paid to the dynamics of how often and how quickly children return to the program. This paper uses administrative data from Maryland to analyze the patterns of returns to the subsidy program after a break in subsidized care. We find that half of children who exited the program return to subsidy within five years, and most of those return within a few months. Returns to subsidized care are related to family circumstances, type of care, child age, and program policies related to eligibility redetermination. These factors have differential effects on the probability of returning to the same provider or a different provider, which may have important implications for the stability of children's care.

Keywords: Child care subsidy, child care, child care continuity, competing risk, survival analysis, duration analysis

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1 Introduction

The federal government, in partnership with states, provides funding through the Child Care and Development Fund (CCDF) for child care subsidies to help low-income families pay for child care so parents can work or participate in education or training activities. Each month, over 1.4 million children in the United States receive CCDF child care subsidies (U.S. Department of Health and Human Services Office of Child Care 2015). High-quality, affordable child care can help parents balance work and family responsibilities. Nearly two-thirds of American children under age 5 spend time in child care on a regular basis (Laughlin 2013), typically because their parents are working. The Child Care and Development Block Grant (CCDBG) Act of 2014, which reauthorized CCDF for the first time since 1996, renewed and expanded the policy focus on health and safety, quality of care, and the stability of child care assistance to families (Administration for Children and Families Department of Health and Human Services 2014).

Child care subsidies provide an important work support for low-income families, yet it is common for children to receive subsidies for only a short period of time. The instability of subsidy receipt has raised concerns that the subsidy program may contribute to instability in child care arrangements, which has been associated with poor developmental outcomes for children (Adams and Rohacek 2010; de Schipper, Van Ijzendoorn, and Tavecchio 2004; Howes and Hamilton 1992; Pilarz and Hill 2014; Sandstrom and Huerta 2013; Tran and Weinraub 2006). Short duration of subsidy participation and cycling on and off the program also may disrupt parental employment and education (Forry and Hofferth 2011; Ha and Meyer 2010; Henly and Lyons 2000; Press, Fagan, and Laughlin 2006). Previous research has established that many families exit the subsidy program even though they appear to remain income-eligible (Grobe, Weber, and Davis 2008; Ha and Meyer 2010). Many families reenter the program

quickly, often within three months (Grobe, Weber, and Davis 2008; Ha 2009; Meyers et al. 2002; Pilarz, Claessens, and Gelatt 2016), which may indicate that the break in participation was unintended. The CCDBG Act of 2014 specifies a number of requirements intended to increase the stability of child care subsidies for families. In addition, the new rule encourages CCDF Lead Agencies to "use administrative data to understand the extent to which CCDF families cycle on and off the program, to make a determination as to whether it is in the interest of anyone (child, parent, or agency) to terminate assistance for families who may ultimately return to the program" ("Child Care and Development Fund (CCDF) Program; Final Rule." 2016, 67465).

This paper answers that call by using five years of administrative data on child care subsidy receipt from Maryland to examine the probability and speed of returns to the subsidy program after a break in participation. We describe the overall pattern of returns to subsidy and examine the relationships between returns to subsidized care and child, family, and provider characteristics, as well as subsidy policy. We build on prior literature on child care subsidy dynamics by estimating both a Cox proportional hazards model for returning to subsidy and a competing risk model to differentiate between returns to the same or a different provider. The study has direct implications for states as they implement changes to their subsidy programs under the new CCDBG Act and demonstrates the potential of administrative data to help policymakers better understand patterns of discontinuous subsidy use.

2   Background

2.1   The Child Care Subsidy Program

Child care subsidies have become a critically important support for low-income working families since the passage of the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) in 1996. At that time, a number of child care programs were consolidated into a single block grant and funding was increased substantially. In federal fiscal year 2014, total child

care assistance spending was $8.4 billion and there were 1.4 million children served by CCDF each month, on average (U.S. Department of Health and Human Services Office of Child Care 2016, 2015). As well as acting as a work support, child care subsidies are intended to improve access to high quality child care and enhance child development ("Child Care and Development Fund (CCDF) Program; Final Rule." 2016). Each state sets policies for its child care subsidy program with regards to income eligibility limits, copayment amounts, provider payment rates and spending priorities within broad federal guidelines.

2.2   Stability of Subsidy Receipt

The concern of policymakers about instability of subsidy participation is evident in the CCDBG Reauthorization Act of 2014. In support of requirements to improve the stability of subsidy receipt, the legislation referenced evidence that short spells of subsidy receipt were common ("Child Care and Development Fund (CCDF) Program; Final Rule." 2016). A national study of 35 states found a median spell of subsidy receipt lasted six months based on data from (fiscal year) 2009. The states in the study had median spell lengths ranging from 3 to 13 months (Swenson 2014). In Maryland, subsidy spells have recently been estimated to have a median length of 25 weeks (approximately six months) (Davis, Krafft, and Forry 2016). Most studies of individual states have found similar patterns, with median subsidy spell lengths typically in the 4 to 8 month range (Davis et al. 2013; Ha, Magnuson, and Ybarra 2012; Meyers et al. 2002). While a few studies have found longer subsidy spells (Henly et al. 2015; Pilarz, Claessens, and Gelatt 2016), differences in sample construction and methods make it difficult to directly compare the findings.

Research has also established that many families return quickly to the subsidy program after a short spell. A study of subsidy dynamics across five states found that after a break, between 20% and 46% of children (depending on the state) returned within 3 months (Meyers et

al. 2002). Between 35-58% of children returned to subsidy within a year (Meyers et al. 2002). Studies have found that short participation spells are often followed by quick returns. Ha (2009) found that among Wisconsin families who had a subsidy spell of three months or shorter, three-quarters of these families subsequently returned to the subsidy program, half doing so within four months of leaving. Pilarz , Claessens and Gelatt (2016)found that among families who exited within 12 months, about one-third returned within three months. Discontinuities in subsidy participation are also evidenced by multiple spells of participation. Ha (2009) and Ha et al. (2012) report an average of 2 to 3 spells per family over several years. A recent national study found that while children had median initial participation spells of six months, over a 36-month period, children's cumulative participation averaged 12 months (Swenson 2014). These patterns of returns to subsidy suggest that exits tend to be temporary, and may be associated with substantial instability in work and child care.

A growing body of research attempts to understand why subsidy spells typically are short and discontinuous. Prior research has identified both administrative barriers and temporary changes in eligibility as key drivers of churning (quickly exiting and quickly returning) in the subsidy program. During the time periods studied in prior research, many families were required to recertify their eligibility every three to six months (Minton et al. 2013). Studies using data from several different states have demonstrated that families are significantly more likely to leave the subsidy program at the time of eligibility recertification. Essentially, they find an association between length of eligibility certification and subsidy spell lengths (Davis, Krafft, and Forry 2016; Grobe et al. 2016; Grobe, Weber, and Davis 2008; Ha and Meyer 2010; Meyers et al. 2002; Michalopoulos, Lundquist, and Castells 2010; Pilarz, Claessens, and Gelatt 2016; Weber, Grobe, and Davis 2014). Families also leave the subsidy program because of loss of eligibility, particularly due to employment changes or job loss (Grobe et al. 2016; Ha and Meyer

2010; Henly et al. 2015; Weber, Grobe, and Davis 2014). Studies from several states have shown that families receiving subsidies for reasons related to education and training or while on TANF tend to have shorter spells (Davis, Krafft, and Forry 2016; Grobe et al. 2016; Grobe, Weber, and Davis 2008; Henly et al. 2015; Meyers et al. 2002; Weber, Grobe, and Davis 2014).

The implications for children and families of short and discontinuous spells depend in part on the reason(s) for the disruption, how long it lasts, and how it impacts children's care arrangements. We are particularly concerned with short breaks in participation that occur when families are still eligible but stop receiving subsidies for reasons related to administrative procedures or paperwork ("administrative churning"). In addition, breaks in receipt that result in the end of a child care arrangement that otherwise would have continued raise concerns that the disruption may impact the child's development or the parent's employment. Breaks in subsidy receipt that occur because families are temporarily ineligible, due for example to a short period without employment, also raise concerns about the stability of the child's care arrangements. When there is a gap in subsidy payments, the parent may pay for the care, may change to a less expensive care option or may end all non-parental care arrangements(Henly et al. 2015).

One indicator of the level of disruption caused by cycling in and out of the subsidy program is whether the child care arrangement changes between spells of participation. Ha, Magnuson and Ybarra (2012) reported that 37% of children with more than one spell returned to the same subsidized provider when they reentered the program. In contrast, Pilarz et al. (2016) reported that only about one third of children changed providers when they returned, and found that those with longer gaps in participation were more likely to change providers between spells. The difference in findings is due in part to the study design: Pilarz et al. only observed families for 18 months after starting a spell of subsidy participation whereas Ha et al. tracked families from two to five years. Both studies examined the relationship between the number of subsidy

spells and number of subsidy providers. The current study builds on this past research by using a survival analysis framework to examine the speed and probability of re-entry into the subsidy program.

While a growing body of literature has documented the frequency of short and discontinuous spells of participation in subsidy programs in different states, fewer have examined the factors associated with returns or reentry to the subsidy program. One study estimated multivariate models for number of spells and predictors of reentry in New York and Illinois (Henly et al. 2015). Using multinomial logistic models, they estimated predictors of reentry within three months, four to six months or after six or more months (or never). Despite having only a maximum of 18 months to follow the families in their study, the study found that one quarter of families exited and returned to subsidy. The rate and speed of subsidy returns varied across the four sites studied, and speed of returns was related to child age, type of care, and family copay in Illinois. Pilarz and colleagues (2016) also analyzed predictors of changes in provider between subsidy spells, although they had a limited time period for tracking families. They found that children were more likely to experience a change in provider between spells of subsidy participation if they had longer gaps, more changes in provider during the prior subsidy spell, or were in family child care or informal care (relative to center-based care).

The empirical literature has greatly increased our understanding of subsidy instability in terms of subsidy spell lengths, reasons for exiting the program and the rate of churning. Nonetheless, gaps remain, particularly in understanding factors related to the probability and speed of returns to the program. The present study builds on the previous literature by examining predictors of subsidy returns using multivariate survival analysis in order to account for the fact that many families do not return to the subsidy program after exiting. Examining the number of spells within a certain period captures the frequency of returns over a fixed length of time but not

the dynamics of breaks' duration or timing. Alternatively, studying cumulative subsidy receipt over a specific (for instance, 24-month or 36-month) observation period, another common approach, does not distinguish whether there are breaks in subsidy receipt, how often, or how quickly children return. In this study we use survival analysis methods to assess the probability and timing of children's returns to subsidy after a break in subsidy receipt. No studies to date have used multivariate survival analysis to study returns to the subsidy program, although there have been numerous applications of multivariate survival analysis methods to the study of subsidy participation spells, including Cox proportional hazards models to estimate the determinants of subsidy exit (Davis, Krafft, and Forry 2016; Grobe, Weber, and Davis 2008; Ha 2009; Henly et al. 2015; Weber, Grobe, and Davis 2014).

Despite widespread interest and concern about instability in subsidy participation, there is no commonly accepted definition of instability. Most studies of subsidy participation use monthly data, and use a gap of (at least) one month to define an exit from the subsidy program. Thus measures of returns to the subsidy program in most studies are based on whether families return after one or more months without subsidized child care. In this study, we have weekly data on subsidy receipt, which provides the opportunity to investigate how the pattern of exits and returns ("cycling" or "churning") varies depending upon how short a time period is used to define a break in subsidy receipt. We use the term 'gap length' to indicate how many weeks occur without subsidized care after a spell of subsidy receipt for a child. With weekly data on subsidy receipt, we can examine very short gaps.

By using weekly data and multivariate survival analysis methods to examine returns to the subsidy program, this study provides both methodological and substantive contributions to the literature on instability in the child care subsidy program. We address the following three research questions:

1) Using weekly data, how do different definitions of a break in subsidy participation change the length of gaps in subsidy participation and the rate of return?

2) What factors are associated with children returning to subsidized care after an exit from the subsidy program?

3) What factors increase the likelihood of returning to the same provider or a different provider?

This analysis has important implications for states as they implement the provisions of the CCDBG Reauthorization Act. Information gleaned from administrative data can help policymakers understand the factors associated with discontinuous subsidy use and the patterns of that discontinuity in order to assess the potential problems caused by these disruptions and provide insights into how to lessen them.

2.3   Policy Context in Maryland

The Child Care Subsidy program in Maryland provides financial assistance to eligible low-income parents to help pay for child care while they are working or in school or training. Eligibility for child care subsidies in Maryland is set at 50% of the state median income, with the 2014 maximum income set at $35,702 for a family of four (Maryland State Department of Education 2014a). Eligible families receive a voucher that they may use for care from a provider they choose, which may be a licensed child care center, a registered family child care provider, or an informal provider such as relative. Priority is given to applicants or recipients of Temporary Cash Assistance (TCA, Maryland's Temporary Assistance for Needy Families (TANF) program), and there is a waiting list for subsidies in some locations (Schulman and Blank 2013). In fiscal year (FY) 2014, an average of 18,000 children and 10,500 families received child care subsidies each month in Maryland. Spending on child care subsidies has been declining in Maryland, from almost $100 million dollars in FY2009 to $81 million in FY2014,

and as a result the number of children and families served has fallen by more than a quarter (Maryland State Department of Education 2014b).

Details of Maryland's eligibility redetermination policy and process are important to understand given the associations found in previous research between redetermination and subsidy instability (author citation, 2016). During the study period, eligibility redetermination was required every 12 months (Minton et al. 2013) but in practice caseworkers could and did set redetermination dates shorter than 12 months based on family circumstances and local practices.[2] Families were required to re-certify their eligibility at regular intervals and in the interim, were required to report changes to income and other factors that might affect their eligibility status. Once the family chooses a care provider, a voucher is issued to authorize payments to that provider. The authorization period for the voucher may be shorter than the family's eligibility period. When the voucher authorization ends, a new voucher must be issued in order for the provider to continue to receive payment from the child care subsidy program. Previous research has demonstrated that families were more likely to exit the subsidy program in Maryland when their eligibility period or voucher authorization were about to expire (author citation, 2016). In this study, we examine the influence of eligibility certification and voucher authorization on the likelihood that a child returns to the subsidy program.

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[2] The description of Maryland's policies and procedures is based on the authors' discussions with state officials and review of Maryland regulations. This section describes the policies and procedures in place at the time of the study.

3 Method

3.1 Data and sample

The Maryland State Department of Education provided data on child care subsidy program participants, their parents, and their caregivers from the program's information management system through a data sharing agreement. The data consist of weekly subsidy participation records from June 25, 2007 to September 28, 2012. This paper examines children who were on subsidized care during this period and who at some point stopped receiving subsidized care. Thus the study population is all children who exited the subsidy program during the time period, a total of 85,841 children.

3.2 Measures

3.2.1 Defining subsidy receipt and breaks in receipt

Subsidy receipt was determined based on payment data for the week in which the services were received.[3] These data were available on a weekly basis. A child was considered to have received subsidy if there was any payment made from the subsidy program to a provider for that week.[4] In terms of returns to subsidy, we examine 'gaps' in subsidy use and measure the

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[3] The data are based on vouchers, which are used to authorize payments to a specific provider for care for a specific child. A voucher can only cover one provider, but children can have multiple vouchers with the same provider at the same time (due to a temporary increase in authorized hours of care for example), or multiple vouchers covering multiple providers.

[4] The provider may be paid even if the child is absent (for a short period). We do not have attendance records, and we therefore consider all weeks for which the provider was paid for services to be weeks when the child received subsidy. The payment data were extracted at least

length of time the child did not receive subsidy. A gap is therefore measured as the number of

consecutive weeks without any payments to providers for a child. A return to the subsidy

program (and the end of a gap) occurs when a child has at least one week utilizing subsidy after a

break in subsidy participation. Not all children are observed to return to the subsidy program.

Some may return at a later date (after the last date in the dataset), and some may never return.

Because we have weekly data on subsidy receipt, we can examine very short gaps in payments.

We use (minimum) gaps of 1, 2, 4, 6, 8, or 12 consecutive weeks without subsidy receipt to

illustrate how the results change for a range of definitions.

3.3   Analytical Approach

3.3.1   Describing the Timing and Probability of Returns

  In understanding the probability and time to returns, there are a number of different

methodological challenges that need to be considered. Left censoring, when the full length of a

gap is not known because we do not observe its start, is typically a concern in duration or event

history studies. However, because we have data on children participating in the subsidy program,

we observe the start of the first gap for all children (if they exit the subsidy program during the

study period). So none of the gaps are left-censored.

  However, right censoring, not knowing the full length of a gap because a child has not yet

(and may not ever) return, is an important issue. Many gaps will not have ended during the

observation period, as the children will not have returned to the subsidy program. Simply using

the length of gaps that have ended would be incorrect, as would including those that have not

ended and treating their last observed length as final. Therefore we rely on survival analysis

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six months after the last service date so that administrative delays in payment are unlikely to be

the cause of the breaks.

methods that account for right censoring and incorporate information from observations for which the event (return to subsidy program) has not yet occurred (and may not occur). To describe the length of gaps in a univariate framework, we use the Kaplan-Meier estimator, which can be used to show the probability of a gap continuing (survival) or ending (failure) at each given week, accounting for right censoring (Moeschberger and Klein 2003). We report results only for the first gap we observe for each child during the time period. Results including all observed gaps, which stratified on the rank order of the gap, and the characteristics of multiple gaps were very similar to first gaps, so we present first gaps only for simplicity.

3.3.2 *Multivariate Cox Proportional Hazards Models for the Probability of Return*

We rely on a number of key survival analysis concepts in our multivariate models that take into account both duration and censoring. Denote as T the time at which an event (a return to subsidized care) occurs. A hazard function, $h(t)$ can be used to model the probability of a return between time t and $t+\Delta t$ conditional on survival (not yet returning) until time t or later:

$$h(t) = \lim_{\Delta t \to 0} \frac{\Pr\left(t \leq T < t + \Delta t | T \geq t\right)}{\Delta t}$$

In order to understand the relationship between covariates and the timing and probability of returning to child care subsidy, we use a Cox proportional hazards model. The Cox proportional hazards model estimates the hazard of experiencing a return at time t based on (Moeschberger and Klein 2003):

$$h(t|X) = h_0(t)exp\left(\sum_{k=1}^{p} \beta_k X_k\right)$$

In this model, $h_0(t)$ is the baseline hazard of ending a gap, which does not have a pre-specified form, X_k are the covariates whose relationships with returns we wish to estimate, and β_k are the parameters to be estimated. These β_k can be transformed into hazard ratios, which are

the relative change in hazard that occurs with a one-unit change in covariate (or a change from 0 to 1 for dummy variables). Hazard ratios that are less than one demonstrate that a characteristic decreases the hazard of return, while hazard ratios that are greater than one demonstrate that a characteristic increases the hazard of return. The Cox proportional hazards model takes into account censoring in the construction of the likelihood function (Moeschberger and Klein 2003).

3.3.3   Competing Risk Models for Returns to the Same or a Different Provider

The standard Cox proportional hazards model can be used to assess the relationship between covariates and subsidy returns, but does not allow for consideration of different types of returns. Different types of returns—in this case, either returning to the same provider or to a different provider—are best considered within a competing-risk framework. Competing risk models are commonly used when there are several different potential outcomes over time for each individual, for instance different types of exits from homelessness (Piliavin et al. 1996; Wong, Culhane, and Kuhn 1997), different reasons for job exit (Gunderson and Hotchkiss 2007), or different permanency outcomes after foster care (Akin 2011). The competing risks framework is appropriate when outcomes are mutually exclusive and the timing of the outcomes varies, and allows us to test for different relationships between the independent variables and the different outcomes (Akin 2011). When children experience a disruption in subsidy participation, how quickly they return to the same or a different provider may offer insight into how disruptive the event is for the child.

Similar ideas to the aforementioned hazard and survival functions can be applied in the case of competing risks. Denote the time to return, T, with the subscript j for different types of competing risks (i.e., returns to the same or a different provider). T can be considered the time to failure from any cause, J is the event that occurs. The equivalent concept to the hazard function is a subhazard (subdistribution hazard) function (Fine and Gray 1999):

$$h_j(t) = \lim_{\Delta t \to 0} \frac{\Pr\{t \leq T < t + \Delta t, J = j \mid T \geq t \ or \ (T \leq t \ and \ J \neq j))}{\Delta t}$$

which is the hazard at *t* that a failure occurred from cause *j* given that no failure from cause *j* happened prior to *t*.

While the Kaplan-Meier estimator can be used to describe survival (having not yet returned) or failure (having returned), the appropriate descriptive concept for competing risks is the cumulative incidence function (CIF) (Kalbfleisch and Prentice 2002), which is the probability of failing (returning) from a particular cause (same or different provider) before or at each point in time:[5]

$$CIF_j(t) = \Pr(T \leq t, J = j)$$

The *CIF$_j$(t)* necessarily add up to the Kaplan-Meier failure function for failure from all causes at time *t*. The relationship between the subhazard and the CIF is (Fine and Gray 1999):

$$CIF_j(t) = 1 - exp\left\{-\int_0^t h_j(s)ds\right\}$$

The competing risk multivariate model is a Cox model applied to the subhazards of returning to the same or a different provider. The model therefore has equivalent assumptions to the Cox model (e.g. proportionality). The regression coefficients have a straightforward interpretation in terms of the effect of the covariates on the CIF (Fine and Gray 1999). Positive coefficients increase the CIF (indicating a positive association between the covariate and the specific failure, e.g. the probability of returning to the same provider), while negative coefficients decrease the cumulative incidence function.

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[5] We estimate the CIF non-parametrically using the STATA program stcompet (Coviello and Boggess 2004).

3.3.4 Covariates

The administrative data include a number of important characteristics of the child, family and provider during the period of participation in the subsidy program. Demographic characteristics, such as the child's sex and race or ethnicity as well as family structure (one or two parents in the household, household size) may influence parents' decisions with regards to child care and subsidy use. Factors related to subsidy participation include the reason for subsidy, which is categorized as employment, education and training, both employment and education or training, protective services, or other. Maryland distinguishes three types of child care providers in the data: licensed child care centers, registered family child care, and informal providers such as relatives or those caring for a child in the child's home.

Previous research has demonstrated important relationships between eligibility redetermination and exiting subsidized care (Davis, Krafft, and Forry 2016; Grobe, Weber, and Davis 2008; Michalopoulos, Lundquist, and Castells 2010; Weber, Grobe, and Davis 2014); in a similar vein, we examine the relationships between the hazard of return and eligibility redetermination. While we do not have direct information on the actual eligibility status of families when they are not receiving subsidy, we examine whether still being certified as eligible is related to the likelihood of returning to the subsidy program.[6] Similarly, we test if the child is more likely to return to subsidy if care for the child is still authorized with at least one provider.

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[6] Still being eligible or authorized is measured based only on information in the subsidy system prior to exit. If families leave subsidy and then some time later recertify their eligibility or are reauthorized in the weeks prior to returning, this does not enter into the measure of still being eligible, as doing so would lead to reverse causality (being eligible because of an imminent return, when we wish to estimate the effect of being still eligible on returning).

3.4   Sample Characteristics

Table 1 describes the characteristics of children at the start of the first gap in subsidy participation that we observe. Most of the characteristics are based on information associated with the last voucher before the gap, as we do not observe their characteristics in the data when children are not receiving subsidy. About a third of children were on Temporary Cash Assistance when they were last on subsidy, and for most children, the reason for subsidy was parents' employment (72.3%). Training and education was also a common reason for subsidy (17.4%), followed by a combination of employment and training or education (6.8%).

The majority of children receiving subsidy were African American (77.1%), with the remainder white (17.3%), Hispanic (4.3%) or some other race (1.3%). Almost all (92.1%) were living in a single parent household. The most common household size was three persons (31.3%), but a variety of household sizes were observed, including 19.2% with five or more persons. We also observe the type of care based on the last voucher prior to the break in subsidy participation. Almost half of the children (48.8%) were in a center prior to exiting subsidy. A third of children were in family child care (32.8%), and the remainder in informal care (18.5%).

At the start of their first observed break, 10.8% of children were infants (0 to 15 months), 19.9% were toddlers (16 to 31 months), 29.1% were preschoolers (32 to 59 months), and 40.3% were school age (60+ months). Since we are examining the first observed break, the most common start year is 2008 (24.0%), our first full year with data. A substantial share of the first-gap sample started in each of the other years; keep in mind that 2007 and 2012 were partial years of data. Gaps in subsidy participation were particularly common in June, July, August, and September, which were probably related to summer and start of school year changes in child care needs.

4   Results

4.1   *Analysis of Different Definitions of a Break in Subsidy Participation*

We first examine patterns of returns to the subsidy program based on different gap lengths in order to demonstrate the influence of different definitions on the results. This analysis is informative for understanding different patterns of subsidy discontinuity, including the prevalence of very short gaps in participation. Table 2 shows how gap lengths vary by different definitions based on the minimum number of weeks not receiving subsidy considered to be a break in subsidy participation. If we use the shortest possible gap (in this data set), one week, to define a break in subsidy participation, 25% of children return within two weeks, and half return within 21 weeks. However, even with the five years of data, the 75th percentile is not defined; that is, less than 75% of children have returned to the subsidy program even after five years (and may never return).

When breaks are defined using a longer time period, returns take longer (by definition). Using a minimum two-week definition of a gap, 25% of children return within four weeks, and 50% within 32 weeks. With a minimum four-week gap, 25% of children return within 14 weeks and 50% within 258 weeks (approximately five years). For comparison purposes, we also show definitions based on long gaps of six, eight and twelve weeks and with each of these definitions, fewer than half of children return for another spell of subsidy receipt. With a six-week gap, 25% of children return after 24 weeks. With an eight-week gap, 25% of children return after 33 weeks, and with a 12-week gap, 25% of children return within 55 weeks (about a year).

Figure 1 adds further detail to demonstrate why it is important to consider different definitions of a break. The figure shows the cumulative proportion of children returning to subsidy, with each curve based on a different definition of the minimum break. The shape is fairly similar across the different definitions. Based on a one- or two-week gap, most children

who return to subsidy do so rapidly, and even with the longer eight and twelve week definitions most children who return do so within a year. Under all definitions a substantial share of children return after a break in subsidized care but many do not. However, the specific conclusions about the probability and speed of returns differ depending on the definition of a break used.

When using a definition of a break based on a longer time period, shorter gaps are no longer counted as breaks but instead the (few) weeks off subsidy are included as part of the spell of subsidy receipt, and treated as part of a continuous spell. Although the choice of break length matters, there is no theoretically correct definition of a break. For the multivariate analysis in this paper, we use a four-week gap to define the end of a period of subsidy receipt.[7] A gap of one or two weeks seems too short, as children might not receive subsidized care for a week or two due to illness, school breaks, or some other reason that is unlikely to represent a substantial discontinuity in children's experience of care or the effectiveness of subsidy as a work support. Four weeks without subsidy, on the other hand, represents a substantial discontinuity. Thus we use gaps of four weeks (or more) for the remainder of this paper.

4.2   Patterns of Gaps in Subsidy Participation

Using four weeks to define a break in subsidy participation, one quarter of children return to the subsidy program within 14 weeks, yet the median gap was 258 weeks, or nearly 5 years. In other words, as shown in Figure 1, children who returned to the subsidy program mostly did so fairly quickly, and half did not return. In Table 3, the proportion of children returning after a

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[7] Most of the literature uses a one-month gap to define an exit from subsidy (when measuring the length of subsidy participation spells), although a few have tested one- vs. two-month definitions. Results based on weekly data and a four-week gap are not directly comparable to those based on monthly data and a one-month gap (Krafft, Davis, and Forry 2014).

certain number of weeks have elapsed is shown for various demographic groups. Overall, just under 25% of children returned within 13 weeks, and 33% did so within one year. The percentage of children who reentered the program continued to rise over time, but remained below 50% at 3 years. The percentage returning within 13 weeks was slightly lower for white children compared to Black and Hispanic children, and was lower for school-age children than younger ones. Infants were most likely to return at every time period than other age groups, and single parents more likely than two parent families. There also was variation in percentage returning by Temporary Cash Assistance status and reason for subsidy, but most of the differences by subgroup were no more than a few percentage points. We next turn to a Cox model to estimate the associations between returns to the subsidy program and these characteristics and test for statistically significant differences in a multivariate framework.

4.3   Cox Proportional Hazards Model for Returns

The Cox proportional hazards model estimates how child, family, and provider characteristics affect the hazard that a child will return to subsidy after a four-week (or longer) break. Table 4 presents the Cox proportional hazards model for returns to subsidized care in terms of hazard ratios. A hazard ratio greater than one indicates that a characteristic increases the hazard of return each week (and therefore decreases gap length), while a hazard less than one indicates that a characteristic decreases the hazard of return each week (and therefore increases gap length). If the family had been receiving Temporary Cash Assistance at the start of the gap, the child had a significantly greater hazard of returning each week, about 1.1 times the hazard of non-TCA families. Individuals who had higher incomes were significantly less likely to return each week to subsidized care.

Relative to employment, those whose reason for care included training or education (with or without employment) had significantly higher hazards of return each week. Compared to

whites, all other races had significantly higher hazards of return each week, African Americans particularly so (46% higher). Children of single parents were also significantly more likely to return each week (20% more likely compared to two parent households). Relative to households of three, households of two were significantly less likely to return, and households of four significantly more likely to return. Compared to those who had been in center care, those who had been in family or informal care had significantly lower hazards of return each week (14-15% lower). Toddlers, preschoolers and school aged children were significantly less likely to return each week, with toddlers having a 5% lower probability of return, preschoolers a 23% lower probability of return, and school age children a 37% lower probability of return relative to infants.

We find important relationships between the hazard of return and eligibility and authorization status. Looking at the model results, when children were still certified as eligible to return, they were significantly more likely to return to subsidy each week, with a hazard ratio around 2.0, meaning they are twice as likely to return compared to those not still certified as eligible. When children were still authorized with at least one provider, they were significantly more likely to return each week, with a hazard ratio of 2.3. Families are always certified as eligible for care for at least as long as their vouchers are authorized so the effect of authorization compounds the effect of continuing eligibility. The eligibility and voucher effects are notably the highest hazard ratios in the entire model, suggesting that remaining authorized or certified as eligible plays an important role in returning to subsidy. Although this relationship cannot be interpreted causally, it raises the question of why individuals who remain eligible or authorized exit the program but then return.

The timing of exits and returns varied substantially by year and month. We include both the calendar month in which the break began (start month) as well as the current calendar month,

and also include the year in which the break began (start year) to capture seasonal and temporal trends. Breaks that started during the school year had comparable chances of return; in contrast, children with breaks that started close to or during the summer had lower hazard ratios (i.e., were less likely to return to subsidy). When the current month was in the summer, children had higher hazard ratios. These patterns likely represent children switching into and out of subsidized care between the school year and summer months. The chances of returning to subsidized care declined over time from 2007 through 2012.

We also estimated Cox regression models for returns to subsidy separately by age group (results available from authors upon request). The estimated parameters followed similar patterns of size and significance across the four age groups. The largest differences across age groups were for the estimated hazard ratios related to eligibility and authorization. For example, all age groups were significantly more likely to return each week when still certified as eligible, but the hazard ratio for infants was 1.8, compared to a hazard ratio of 2.2 for school-age children (toddlers and preschool-age children were in-between). Similarly, when children were still authorized with at least one provider, they were significantly more likely to return each week, with hazard ratios ranging from 1.9 for infants to 2.5 for school-age children. Not surprisingly, the month dummy variables were more likely to be significant for school-age children than for younger age groups. Overall, however, the patterns of results from the Cox regressions were consistent across age groups.

4.4   Timing and Probability of Returns to the Same or Different Provider

Figure 2 presents the cumulative proportion experiencing returns to the same provider or to a different provider at every point in time after subsidy exit (the cumulative incidence functions). Children who returned to the same provider did so more rapidly than those who returned to a different provider. While 20% of those who exited subsidy returned to the same

provider within half a year, it took almost two years before 20% of those who exited subsidy returned to a different provider. Ultimately, around a quarter of individuals returned to the same provider and a quarter to a different provider by the end of the study period (approximately five years). In other words, among the 50% of children who returned within five years, half returned with the same provider and half with a different provider. Children who had left the subsidy program returned at different rates to the same or a different provider. The time between exit and return was shorter for those returning to the same provider.

4.5 Competing Risk Model for Returns to the Same or Different Providers

Table 5 presents the subhazard ratios for the competing risk model for returns to the same provider or a different provider. Subhazard ratios can be interpreted like hazard ratios for a specific event (i.e., a return to the same provider is a different event than a return to a different provider). The subhazard ratios indicate which characteristics are associated with greater (lower) likelihood of the event if the subhazard is greater (less) than one. Receiving Temporary Cash Assistance at the end of the subsidy spell was associated with significantly higher subhazard of returns each week to a different provider, but not a significant effect on returns to the same provider. Relative to employment, those using subsidy for training or education or both employment and training or education had significantly higher subhazards for returning each week to the same provider. There were no significant differences by child gender. Relative to whites, all other races had higher subhazards for both types of return, usually significantly so; African Americans particularly for returns to a different provider.

The children of single parents had significantly higher subhazards for returns each week to a different provider than do two-parent households. Relative to a household of three, there were significantly lower subhazards for a return to a different provider for households of one or two and significantly higher subhazards for a return to the same provider for households of one,

four, and five or more. Toddlers, preschoolers, and especially school-age children had a significantly lower subhazard of returning to a different provider compared to infants. In contrast, only school age children had a significantly lower subhazard of returning to the same provider.

The subhazard for returning to the same provider if the previous provider was a family child care or informal provider was significantly lower compared to centers, but returns to a different provider were only significantly lower (than centers) for those who previously attended informal care. We interpret the results of the Cox regression and the competing risk model to indicate that children were more likely to return to subsidy each week if their previous provider was center-based (relative to family child care or an informal provider). The likelihood of returning each week to the same provider or to a different provider was lower for those in informal care relative to center-based care.

Eligibility certification was expected to be associated with a higher rate of returns, but voucher authorizations may be more influential on the rate of returns to the same provider. The results in Table 5 show that children still certified as eligible had significantly higher subhazards of return to either the same or a different provider, but the magnitude was much larger for the same provider, an increase of 58% compared to 7% for a different provider. Time left on the voucher authorization was also associated with higher rate of returning each week, but with a higher subhazard ratio for returning to the same provider (an increase of 87%) as compared to returning to a different provider (an increase of 42%). Continuing authorization with a provider may make it easier to return to that same provider, but some who exit subsidy while still authorized with one provider may be switching care to a different provider or may choose a new provider when they do return.

The subhazard ratio of returning to a different provider did not vary much by start month. The subhazard ratio of returning to the same provider was lower for breaks that start during or near the summer. The subhazard ratios of returning to either the same or different provider were higher when the current month is in the summer, with the subhazard ratio of returns to a different provider particularly high at the start of the summer and start of the school year, likely due to taking a break for one part of the year. Over time, the subhazard for both types of returns has decreased, but that for returns to a different provider has decreased more. Individuals in more recent years may be returning more quickly from short breaks to the same provider, or going a longer time before they return to a different provider.

5 Discussion

5.1 Key findings

Subsidies are a cornerstone of work supports for low-income parents, yet instability in child care subsidy participation may have negative consequences for children's development and parental employment. This study builds on prior work to examine the factors associated with returns to subsidy after a break and distinguishes between returns to the same provider or a different provider. Using survival analysis methods to analyze returns allows us to account for right-censoring, which is critically important since about half of the children did not return to the subsidy program in the five-year study period. Examining the patterns of returning in the subsidy program and the factors associated with returning can help policymakers to improve policies in order to enhance the stability of subsidy participation.

Understanding the dynamic patterns of children's participation in the child care subsidy program requires defining when a break in subsidy participation has occurred: specifically, how much time without subsidy should be used as the basis for defining a break. Previous studies of subsidy program participation have used monthly data and most define a subsidy exit as one

month (or more) with no child care subsidy. Because there have been no previous studies of subsidy dynamics using weekly data, we tested alternative definitions of a break in subsidy participation. The measures of stability of subsidy participation, including median gap length and rate of return, vary considerably with different length break definitions. Thus, conclusions about the extent of instability or cycling on and off the program will differ depending on the definition of a break. For example, using a one-week gap definition, one third of children return within four weeks, compared to only 7% returning within four weeks using a four-week gap definition. In the latter case, all gaps of 1, 2 or 3 weeks are no longer considered gaps in participation, but instead are included as part of the subsidy spell (as if it were continuous). Child absences, holidays, and voluntary closures may drive some of these very short gaps in subsidy payments. Whether the provider is paid when the child is absent is related to program rules with regards to type and number of absences.

In many ways, the pattern of returning in the subsidy program in Maryland is similar to patterns reported in other studies of different states and time periods. Short spells of subsidy receipt and quick returns after short breaks are a common pattern, but are not universal. We find that 43% of children return to the subsidy program within one year, similar to the range of 35% to 58% found in the study of five states (Meyers et al. 2002). Similarly, other studies find families have more than one spell of subsidy receipt on average, suggesting many exits are temporary (Ha 2009; Ha, Magnuson, and Ybarra 2012; Henly et al. 2015; Swenson 2014). Our results are also in accord with studies that find that eligibility redetermination plays a role in subsidy instability. Studies have found that parents are more likely to exit subsidy when it is time for eligibility redetermination (Davis, Krafft, and Forry 2016; Grobe et al. 2016; Grobe, Weber, and Davis 2008; Pilarz, Claessens, and Gelatt 2016; Weber, Grobe, and Davis 2014); and here

we find that parents were also more likely to return to the subsidy program prior to the end of their eligibility period.

While other studies have reported on the frequency and speed of returns to the subsidy program, there is limited literature on factors related to those returns. Understanding the heterogeneity of subsidy participation patterns is enhanced by examining the factors related to quick returns. Receipt of Temporary Cash Assistance raised the probability of return, and specifically return to a different provider, which suggests that children who were on Temporary Cash Assistance were experiencing particularly unstable subsidy participation and disruptions in care. Pilarz et al. (2016) similarly analyzed factors related to the probability of changing providers between subsidy spells, although their approach differed from ours. They found that the odds of changing providers between subsidy spells increased with the length of the gap and the number of provider changes during the prior participation spell. They also found a relationship between eligibility recertification and changes in provider. Children who exited the subsidy program at the end of the state-set redetermination period were much less likely to change providers upon return. Our results confirm the important influence of eligibility policy on returning to the program and to the same or a different provider. We also found children to be less likely to return to the subsidy program (to either the same or a different provider) if they had been cared for by a family or informal provider (relative to center care). Similarly, Pilarz et al. (2016) found that, among those who did return to the subsidy program, the odds of changing provider were higher for those in family or informal care.

Interestingly, a number of family characteristics that were related to quicker returns to subsidy have been shown in previous studies to be related to the length of subsidy spells. For example, infants and single parents were associated with both being less likely to exit and more likely to return (Davis, Krafft, and Tout 2014; Grobe, Weber, and Davis 2008). The timing of

both exits and returns show some volatility around the summer versus school year divide, consistent with the literature (Ha and Meyer 2010; Swenson 2014). Factors that were related to both short spells and quick returns provide insight into the families and situations most likely to experience churning in the subsidy program (Davis, Krafft, and Tout 2014; Grobe, Weber, and Davis 2008; Ha and Meyer 2010; Henly et al. 2015; Pilarz, Claessens, and Gelatt 2016; Swenson 2014). Those receiving subsidy for training exited more rapidly than those who were employed, but were also more likely to return, thus exhibiting more churning. Those with lower incomes also experienced more churning, as did those who used center care rather than family child care providers.

Whether families remained authorized or certified as eligible for child care played a particularly important role in the probability of returns, whether returning to the same or a different provider. Breaks in subsidy participation prior to the end of a voucher authorization or eligibility period are less likely to be related to system-related reasons. Families who were still certified as eligible were twice as likely to return to subsidy, particularly to the same provider, and this effect was further compounded if children were still authorized with a provider. Research has shown that the process of eligibility re-certification can be a substantial burden for families and is associated with exits from the subsidy program (Adams, Snyder, and Sandfort 2002; Davis, Krafft, and Tout 2014; Grobe, Weber, and Davis 2008; Michalopoulos, Lundquist, and Castells 2010). Needing to recertify may also impede families' ability or willingness to reenter the subsidy system. In addition, in Maryland the length of the voucher authorization also matters for care stability.

5.2   *Study limitations and future research*

We recognize and note that there are several limitations to our findings. We have data from only a single state (Maryland) and labor market conditions, child care markets, and subsidy

policies vary across states. Additionally, there remain many unanswered questions on why individuals exit and then return to subsidy. A great deal of information is simply not available in the administrative data. Some gaps in subsidy participation may occur when a family welcomes a new baby, which is known to be related to changes in child care arrangements (Davis, Carlin, and Krafft 2014). Other subsidy exits may be due to temporary unemployment (Grobe et al. 2016). Because we use characteristics from when the child was last receiving subsidy, changes in employment and income that may drive returns to subsidy are unobserved. One potential solution could be to link administrative data from the subsidy system to other data sources, for instance welfare program data, or unemployment insurance (employment) data. By using subsidy administrative data, we have no information on unsubsidized care arrangements, and so have limited information on whether arrangements actually are disrupted by breaks in subsidy participation. Linking administrative and survey data can be a powerful tool for better understanding why families exit and return to subsidy and whether arrangements continue after leaving the subsidy program (Grobe et al. 2016; Henly et al. 2015; Krafft, Davis, and Tout 2017). Future research using qualitative or survey data to investigate parents' reasons for subsidy exit and return as well as what happens to child care arrangements after exit is needed to deepen our understanding of families' experiences with the child care subsidy program. Further research on why very short gaps in participation occur and whether these cause disruptions in care arrangements or parental employment would help inform researchers and policymakers about the most appropriate definition as well as inform setting policies with regards to temporary absences. Increasing our understanding of why children and families enter, exit, and return to subsidy will enhance the design of subsidy policies to best support the employment of low-income families and the continuity of care for at-risk children.

5.3   Policy implications

The common occurrence of short subsidy spells and quick returns in Maryland as well as other states has raised concerns that families are cycling on and off the subsidy program for administrative reasons rather than due to true changes in eligibility. The reauthorization of CCDBG in 2014 created a number of new requirements in part intended to increase the stability of subsidy participation. A key requirement is the establishment of 12 months of eligibility regardless of temporary changes in parental employment, educational activities, or income (so long as family income remains at or below 85 percent of state median income ("Child Care and Development Fund (CCDF) Program; Final Rule." 2016). This study found that families were more likely to return to subsidy if they were still certified as eligible or had at least one authorized voucher. Thus, the CCDBG reauthorization, which requires the use of 12-month eligibility periods, is likely to influence the dynamics of subsidy participation by influencing returns as well as exits. The new provisions also allow parents to receive subsidies for up to three months of job search or during temporary changes in participation in employment, education and training, which may reduce the frequency of cycling on and off the program due to short breaks in employment. Thus, breaks in subsidy participation due to short periods of ineligibility may be reduced.

Nonetheless, the findings here suggest that it is likely that some instability in subsidy participation will persist. During the time period studied, Maryland had relatively generous policies with regards to subsidy payment for job search, child absences, holidays and voluntary closures, so that short breaks in subsidy payments are somewhat surprising. Analysis of administrative data before and after policy changes are implemented will be important to understand the ways in which subsidy stability has been enhanced. Many children participate in the subsidy program for only a short time and do not return; in this study, about half of children

did not return in five years. Further research is needed to understand the child care needs of these families. Understanding use of other early care and education options such as Head Start or public pre-kindergarten along with or instead of subsidies will help to provide a more complete picture of the need for and supports of quality early care and education for low-income children.

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FIGURES
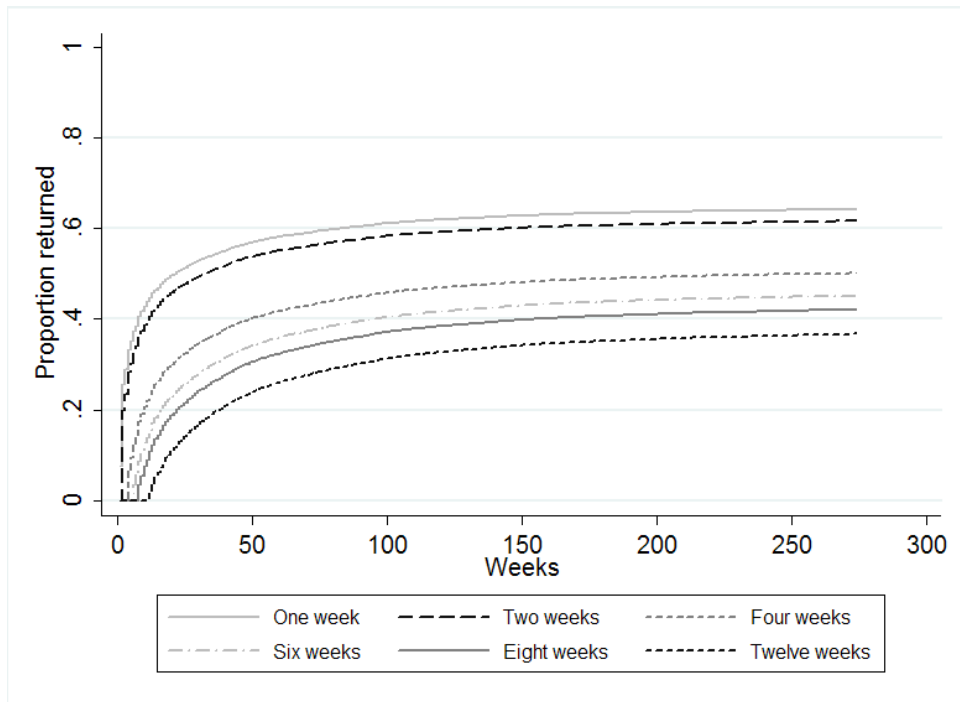
Figure 1. **Proportion of children returning to subsidy using different definitions of a break**
Notes: Failure function using Kaplan-Meier estimator to account for right-censoring.
Source: Authors' calculations based on Maryland Administrative Data.
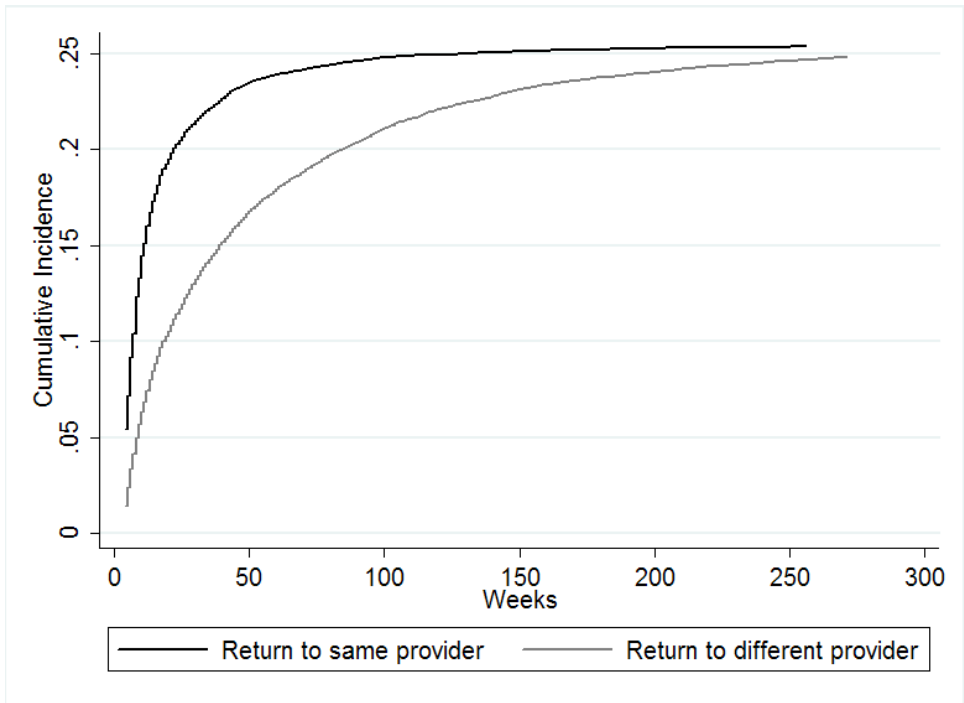
Figure 2. Cumulative Incidence Functions for Returns to Same or Different Provider
Notes: Cumulative incidence functions account for right-censoring.
Source: Authors' calculations based on Maryland Administrative Data.

Table 1. Characteristics of Children at Start of First Observed Gap in Subsidy Participation

	Percentage of children
TCA Status	
TCA	32.0
Not TCA	68.0
Reason for Care	
Employment & Train. or Educ.	6.8
Employment	72.3
Training or Education	17.4
Protective Services	0.1
Other Reason	3.4
Child Sex	
Female	50.1
Male	49.9
Child Race	
Black or African American	77.1
Hispanic	4.3
White	17.3
Other Race	1.3
Number of Parents	
Two Parents	7.9
Single Parent	92.1
Household Size	
One	2.5
Two	24.3
Three	31.3
Four	22.7
Five +	19.2
Type of Care	
Center	48.8
Family	32.8
Informal	18.5
Child Age	
Infant	10.8
Toddler	19.9
Preschooler	29.1
School Age	40.3
Start Year (of break)	
2007	16.4
2008	24.0

2009	19.0
2010	17.8
2011	15.1
2012	7.8
Start month (of break)	
January	8.1
February	6.2
March	7.4
April	6.4
May	7.0
June	8.7
July	10.8
August	12.5
September	9.6
October	8.0
November	7.4
December	8.0
N (children)	85,841

Source: Authors' calculations based on Maryland Administrative Data.

Table 2. Gap Length Distribution using Different Definitions of a Break

Number of weeks used to define a break in subsidy participation	25th percentile	50th percentile (median)	75th percentile	N (Observations)
One week	2	21	.	88,724
Two weeks	4	32	.	88,074
Four weeks	14	258	.	85,481
Six weeks	24	.	.	83,685
Eight weeks	33	.	.	82,645
Twelve weeks	55	.	.	80,505

Notes: Gap durations calculated with Kaplan-Meier method to account for right censoring. The percentiles are missing (".") when (within the study period) less than that percentage of children return to subsidy.
Source: Authors' calculations based on Maryland Administrative Data.

Table 3. Percentage of Children Returning to Subsidy Program within Various Time Periods, by Characteristics at Start of Break

Number of weeks since starting gap:	13 weeks	26 weeks	One year	Two years	Three years
Gender					
Male	25	33	40	46	48
Female	25	33	41	46	49
Race					
Black	25	34	42	48	51
White	21	28	34	38	40
Hispanic	25	31	36	41	42
Other	22	30	37	42	44
Age					
Infant	30	41	51	59	62
Toddler	28	38	47	54	57
Preschooler	25	33	40	46	48
School age	22	29	35	39	41
Parents					
Two parents	22	29	34	39	41
Single parent	25	33	41	47	49
Temporary Cash Assistance receipt					
No TCA	24	32	38	43	45
TCA	26	36	46	53	56
Reason for subsidy					
Employment and Train./Educ.	27	35	42	47	49
Employment	24	32	39	44	46
Training/Educ.	27	37	47	53	56
Other	26	36	45	52	54
Total	25	33	41	46	48

Source: Authors' calculations based on Maryland child care subsidy administrative data.
Note: Survival functions were estimated using the Kaplan-Meier method based on the first gap for all children.

Table 4. Cox Proportional Hazards Model for Returns to Subsidized Care, First Gap

Hazard Ratios, Standard Errors in Parentheses

TCA Status (Not on TCA omitted)	
TCA	1.133***
	(0.017)
Family Income (in thousands)	0.994***
	(0.001)
Reason for Care (Employ. Omitted)	
Employment and Train. or Educ.	1.128***
	(0.023)
Training or Education	1.145***
	(0.017)
Protective Services	1.006
	(0.217)
Other reason	1.048
	(0.029)
Gender (Female omitted)	
Male	0.992
	(0.010)
Race (White omitted)	
Black or African American	1.459***
	(0.022)
Hispanic	1.227***
	(0.036)
Other race	1.212***
	(0.059)
Single Parent	1.208***
	(0.025)
Household Size (three omitted)	
One	0.945
	(0.034)
Two	0.899***
	(0.012)
Four	1.035*
	(0.014)
Five+	1.030
	(0.016)
Type of care (center omitted)	
Family	0.851***
	(0.010)
Informal	0.861***
	(0.012)
Age (infant omitted)	
Toddler	0.948**
	(0.016)
Preschooler	0.774***
	(0.013)
School Age	0.627***

	(0.010)
Still Certified as Eligible	2.016***
	(0.031)
Still Authorized	2.256***
	(0.034)
Start month (Jan. omitted)	
February	1.013
	(0.028)
March	0.977
	(0.026)
April	0.855***
	(0.024)
May	0.918**
	(0.025)
June	0.898***
	(0.024)
July	0.931**
	(0.023)
August	0.869***
	(0.022)
September	0.869***
	(0.023)
October	0.943*
	(0.025)
November	0.951
	(0.025)
December	1.016
	(0.026)
Current month (Jan. omitted)	
February	0.828***
	(0.022)
March	0.919***
	(0.023)
April	1.001
	(0.026)
May	0.945*
	(0.025)
June	1.206***
	(0.030)
July	0.926**
	(0.025)
August	1.480***
	(0.034)
September	0.998
	(0.025)
October	0.907***
	(0.023)
November	0.869***
	(0.023)
December	0.797***

	(0.021)
Start year (2007 omitted)	
2008	0.884***
	(0.014)
2009	0.832***
	(0.014)
2010	0.787***
	(0.014)
2011	0.688***
	(0.014)
2012	0.717***
	(0.021)
P (Model)	0.000
Number of Children	85,474

Notes: *p<0.05, **p<0.01, ***p<0.001
Source: Authors' calculations based on Maryland Administrative Data.

Table 5. Competing Risk Model for Returns to a Different or the Same Provider, First Gap

Subhazard Ratios, Standard Errors in Parentheses

	Return to a Different Provider	Return to the Same Provider
TCA Status (Not on TCA omitted)		
TCA	1.276***	0.989
	(0.027)	(0.021)
Family Income (in Thousands)	0.993***	0.995***
	(0.001)	(0.001)
Reason for Care (Employ. Omitted)		
Employment and Train. or Educ	0.995	1.171***
	(0.031)	(0.032)
Training or Education	1.006	1.180***
	(0.021)	(0.024)
Protective Services	1.597	0.665
	(0.469)	(0.224)
Other reason	0.971	1.061
	(0.037)	(0.042)
Gender (Female omitted)		
Male	1.005	0.992
	(0.015)	(0.014)
Race (White omitted)		
Black or African American	1.425***	1.231***
	(0.033)	(0.024)
Hispanic	1.109*	1.150***
	(0.051)	(0.045)
Other race	1.200*	1.106
	(0.086)	(0.072)
Single Parent	1.335***	1.048
	(0.044)	(0.029)
Household Size (three omitted)		
One	0.746***	1.110*
	(0.044)	(0.051)
Two	0.859***	0.965
	(0.017)	(0.019)
Four	0.996	1.046*
	(0.020)	(0.020)
Five+	0.993	1.043*
	(0.022)	(0.022)
Type of care (center omitted)		
Family	1.031	0.769***
	(0.017)	(0.012)
Informal	0.882***	0.905***
	(0.019)	(0.017)
Age (infant omitted)		
Toddler	0.865***	1.024
	(0.020)	(0.026)
Preschooler	0.623***	0.997

	Return to a Different Provider	Return to the Same Provider
	(0.015)	(0.024)
School Age	0.481***	0.898***
	(0.011)	(0.022)
Still Eligible	1.074***	1.582***
	(0.023)	(0.030)
Still Authorized	1.415***	1.874***
	(0.035)	(0.036)
Start month (Jan. omitted)		
February	1.004	0.981
	(0.040)	(0.037)
March	0.949	0.937
	(0.037)	(0.035)
April	0.841***	0.847***
	(0.036)	(0.035)
May	0.961	0.833***
	(0.039)	(0.034)
June	0.928	0.861***
	(0.037)	(0.033)
July	0.939	0.854***
	(0.036)	(0.033)
August	1.007	0.775***
	(0.037)	(0.029)
September	0.983	0.862***
	(0.038)	(0.034)
October	1.013	0.939
	(0.040)	(0.037)
November	0.982	0.968
	(0.039)	(0.037)
December	0.943	1.053
	(0.036)	(0.037)
Current month (Jan. omitted)		
February	0.856***	0.864***
	(0.035)	(0.031)
March	0.967	0.965
	(0.038)	(0.035)
April	1.101*	1.045
	(0.045)	(0.040)
May	1.086*	0.986
	(0.044)	(0.039)
June	1.456***	1.132**
	(0.056)	(0.044)
July	1.088*	0.903*
	(0.045)	(0.037)
August	1.440***	1.421***
	(0.053)	(0.050)
September	1.152***	0.908*
	(0.045)	(0.035)

	Return to a Different Provider	Return to the Same Provider
October	0.961	0.875***
	(0.039)	(0.033)
November	0.921*	0.865***
	(0.037)	(0.032)
December	0.714***	0.900**
	(0.030)	(0.031)
Start year (2007 omitted)		
2008	0.904***	0.893***
	(0.021)	(0.021)
2009	0.798***	0.899***
	(0.020)	(0.022)
2010	0.655***	0.937**
	(0.017)	(0.023)
2011	0.541***	0.827***
	(0.016)	(0.022)
2012	0.558***	0.730***
	(0.025)	(0.027)
P (Model)	0.000	0.000
Number of Children	85,474	85,474

Notes: *p<0.05, **p<0.01, ***p<0.001
Source: Authors' calculations based on Maryland Administrative Data.