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The Impact of SCHIP Premiums and Health Status on the Insurance Coverage of Children

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Abstract

This paper uses data from Kentucky's SCHIP program to address two issues relating to the impact of public premiums on health insurance coverage for children. First, public insurance claims data is used to examine whether or not the impact of public health insurance premiums vary by child health type. Second, results from a survey of families whose children lost SCHIP coverage due to premium non-payment is used to examine the extent to which these children are able to find another source of health coverage. The results suggest that, in general, children with chronic health conditions, such as diabetes, asthma, or a mental health condition, are less likely to leave public coverage than children without one of these health conditions. We find very weak evidence of a differential impact of premiums on enrollment status for children with diabetes, but no evidence of a differential impact of premiums on enrollment for children with other chronic conditions. Our survey results suggest that roughly half of responding families found some type of alternative health coverage after losing SCHIP coverage, with less healthy children being more likely to be covered than healthy children.

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I. Introduction

One recent trend in the provision of both private and public health insurance has been to increase the amount of cost sharing expected from recipients. In the private market, this trend can be seen in the advent of consumer-driven health plans with high deductibles and medical spending accounts. In terms of public coverage, cost sharing is becoming more common in both the Medicaid program and the State Children's Health Insurance Program (SCHIP). This trend has been driven in the Medicaid program by the *Deficit Reduction Act of 2005* (DRA), which allows states greater flexibility to impose cost sharing on Medicaid recipients. The DRA gives state governments the option to increase co-payments from current $3 maximums to up to 20 percent of the cost of the service. In addition, the DRA allows new unlimited premiums for Medicaid beneficiaries with incomes greater than 150 percent of the federal poverty level (FPL). These new premiums and other cost sharing requirements may pose serious barriers to coverage, care, and positive health outcomes (Kaiser Commission 2006).

Next consider the State Children's Health Insurance Program (SCHIP). For a variety of reasons, including increased state budgetary pressures brought on by economic constraints and the depletion of Federal capped matching dollars, premiums have become an increasingly common component of state SCHIP programs. The ease with which premiums have been introduced is due in part to the flexibility that the federal government gave states in establishing separate non-Medicaid programs to cover children. According to Ross and Cox (2005), as of July 2005, 33 states impose premiums or annual enrollment fees for SCHIP coverage, with 10 states charging premiums for children in families with incomes of 101 percent of the (FPL) and above.

The introduction of (or increases in) SCHIP premiums raises many important policy questions and has implications for future cost sharing requirements for the Medicaid program. For example, do premiums reduce enrollment in the SCHIP program? If so, how is this related to the health of the children in the program? In other words, are less healthy children more or less likely to exit as a result of changes in premiums? Do the children that exit SCHIP obtain other insurance coverage, either through other public programs (Medicaid) or the private market?

There is a growing literature that explores the impact of SCHIP premiums using state administrative eligibility data.[1] For the most part, this literature has focused on the first policy question raised above, with the typical result that the duration of enrollment in public coverage does depend on premium levels, in addition to other dimensions of the programs, such as application and renewal procedures. While state administrative eligibility data is useful to analyze trends in enrollment, it cannot by itself address the other policy questions raised above. For example, many states store eligibility data and claims data separately. Other than Shenkman et al. (2002) and Herndon et al. (2006), studies that analyze claims data for Florida SCHIP recipients, it does not appear as though researchers in this literature have had access to claims data in order to control for the health status of children and to address the question of differential effects of premiums by health type.[2] In addition, state eligibility data typically does not track the insurance coverage of children after they leave public coverage. Therefore, additional

[1] Shenkman et al. (2002) and Herndon et al. (2006) examine the impact of premium changes on SCHIP enrollment in Florida. Kenney, Allison et al. (2007) examines premium changes in Kentucky, New Hampshire, and Kansas. Marton (2007) also examines premium changes in Kentucky. Finally, Kenney, Marton et al. (2007) provides a comparative study of premiums in Arizona and Kentucky.

[2] Shenkman et al. (2002) use claims data to construct an indicator for mental health problems and an indicator for having a special health care need. Herndon et al. (2006) uses similar data to sort children into one of five health status categories: healthy, significant acute conditions, minor chronic conditions, moderate chronic conditions, and major chronic conditions.

data is needed in order to analyze whether or not children leaving SCHIP due to premiums non-payment obtain other health coverage.

The purpose of this paper is to extend the literature on SCHIP premiums through the use of claims data on SCHIP recipients and a survey of families that elected to drop SCHIP coverage as a result of the introduction of premiums. With this new claims data we will be able to address whether or not child health is correlated with the decision to drop SCHIP coverage when faced with changes in premiums. In addition, the survey results will allow us to examine whether or not children that leave SCHIP as a result of premium non-payment find other sources of insurance coverage.

In order to make the relationship to the previous literature especially clear, the claims data we use is drawn for the sample of SCHIP recipients analyzed in Marton (2007). In that study, a Cox proportional hazard model is used to assess the impact of the introduction of a $20 per family per month premium on the duration of premium-paying SCHIP enrollment spells in Kentucky. With the claims data we re-estimate the model presented in Marton (2007) with explicit controls for the health status of the children. A comparison of the results illustrates the additional explanatory power of the health indicators. We also interact the health status indicators with the premium indicator to assess whether the effect of the premium varies by health type. In order to complement the hazard analysis we present the results from a survey we conducted (in partnership with the Kentucky Cabinet for Health and Family Services) of families with children that dropped SCHIP coverage as a result of premium non-payment in the first four months after the introduction of the premium (December 2003 – March 2004). The purpose of the survey was to determine why the families did not pay the premium, and the extent to which these children obtained another source of coverage.

The results of the hazard analysis suggests that, in general, children with chronic health conditions, such as diabetes, asthma, or a mental health condition, are less likely to leave public coverage than children without one of these health conditions. For example, the estimated average exit probability for asthmatic children is 2.11 percent, which can be compared to the monthly rate of 3.18 percent at which an average child in the sample exits public coverage. We find weak evidence of a differential impact of premiums on enrollment status for children with diabetes, but no evidence of a differential impact of premiums on enrollment for children with other chronic conditions.

The survey of all families who are coded by the state as having lost SCHIP coverage for non-payment during the first four months after the introduction of the premium reveals that about 43 percent ((40 + 153) / 454 – question 5) of responding families reported losing coverage because they could not afford to pay the ($20) monthly premium. At the same time, 49 percent ((151+73) / 454 – question 7) of responding families report that at least one parent or spouse has either single (33 percent) or family (16 percent) coverage through their employer. When asked another way, 53 percent ((99 + 9 + 32 + 89 + 13) / 454 – question 9) of responding families report having some form of health coverage for at least some-subset of their family members. Therefore, if the responding families are representative of all families that lost SCHIP coverage due to non-payment, then the survey suggests that roughly half of these families were able to acquire some level of insurance after losing SCHIP coverage for their children.

The remainder of the paper is organized as follows, in the next section the SCHIP program in Kentucky is described in more detail, as are the samples of children used in the analysis. In section three, the Cox proportional hazard model estimated in this paper

is described along with the design of the non-payment survey. Section four presents the results and the final section will offer conclusions and policy implications

II. Kentucky's SCHIP Program, the Hazard Sample, and the Survey Sample

A. KCHIP – The Kentucky Children's Health Insurance Program

The Kentucky Children's Health Insurance Program (KCHIP) was initiated on July 1, 1998 by extending Medicaid coverage to children 14 through 18 years old who are in families at or below 100 percent FPL. Today children under the age of 19 with family income at or below 100 percent FPL are eligible for Medicaid. Children under the age of 19 with family income between 101 percent and 150 percent FPL are eligible for KCHIP II, which was set up as a further expansion of Medicaid. Children under the age of 19 with family income between 151 percent and 200 percent FPL are eligible for KCHIP III, which was set up as a stand alone program.[3] To give a sense of the size of these eligibility categories, in 2003 the average monthly enrollment of children in Kentucky Medicaid was 332,700 children, the average monthly enrollment in KCHIP II was 32,171 children and the average monthly enrollment in KCHIP III was 19,459 children. Although no premiums were initially charged for KCHIP coverage, Kentucky began in December 2003 charging a $20 monthly premium for families with children covered by KCHIP III. This policy change was brought on by a variety of factors, including growth in program costs and falling state revenues.

B. The KCHIP 3 Sample for the Hazard Analysis

Marton (2007) uses administrative data on KCHIP III enrollment between December 2001 and August 2004 (33 months) that was provided by the Kentucky

[3] For younger children (under age 6) the family income eligibility cut-offs for Medicaid extend above 100 percent FPL.

Cabinet for Health and Family Services to formally evaluate the impact of this new premium on KCHIP III coverage. The administrative eligibility database provides information on monthly enrollment and program status, as well as demographic variables including age, gender, race, and region of residence. The final sample consists of 46,068 first new KCHIP III enrollment spells initiated during the 33 month period for children aged 1-18 with no missing demographic information. A new KCHIP III enrollment spell is defined to start in the month that a child moves into KCHIP III, whether they had no public coverage in the previous month or were covered under KCHIP II or Medicaid. Unlike much of the literature examining the determinants of the duration of SCHIP enrollment spells, we do not treat transfers to other public coverage (KCHIP II or Medicaid) as exits. Instead we consider continuing months covered under another eligibility category as part of the KCHIP III spell that preceded it. The impact of this assumption will be discussed further in Section IV.[4]

In order to evaluate whether or not the introduction of this premium has a differential effect on enrollment in KCHIP III by child health type, we were given access to the state medical claims data from the Kentucky Medical Management Information System (KYMMIS) claims data warehouse for the sample of 46,068 children described above for the years 2001-2005. With this claims data we are able to create several indicators for the existence of chronic health conditions among children in the sample. The chronic conditions we analyzed are asthma, diabetes, and mental health conditions. We assign a chronic condition to a child if an ICD-9 code or codes associated with the particular condition appears two or more times in their records. The ICD-9 code

[4] For a complete discussion of how this spell definition compares to others in the literature, see Marton (2007).

associated with diabetes is 250, the code associated with asthma is 493, and the codes associated with having a classification of a mental health condition are 290-319.[5] Note that for the mental health classification, we require two appearances of the same code within the 290-319 range.[6]

Descriptive statistics for all children and by exit route are presented in Table 1. Because this sample is described in detail in Marton (2007), here we will focus on the new chronic condition indicators. Having a mental health condition appears to be the most common of the three chronic conditions, with 21 percent of children in the sample identified as having a mental health condition. Note that this is larger than in the Shenkman et al. (2002) study of Florida SCHIP, where 8 percent of children are identified as having a mental health condition.[7] This difference is somewhat surprising given that we explicitly used the same definition for having mental health conditions in order to ease comparisons between the two states. Overall, 14 percent of children in the sample are defined as asthmatics and 1 percent as diabetics. It is interesting to note that children in spells that ended in non-payment or for another reason are less likely to exhibit any of the three chronic conditions relative to children that remained enrolled at the end of the study period (right-censored). These differences are statistically significant and suggest that, while not controlling for other factors, children with chronic conditions are less likely to exit public coverage.

[5] A list of the mental health ICD-9 codes is given in Appendix B.
[6] We acknowledge that administrative data is not a perfect data source for measuring child health, particularly because claims data only reflect information used to establish payments to providers. The most serious information gap occurs during breaks in enrollment, where we do not have any information on health status and utilization. Therefore, our data provides a better proxy for members who remain enrolled for longer periods.
[7] We would need to require __ appearances of the same ICD-9 code in order to reduce the number of children defined as having a mental health problem to the level observed in the Florida study.

C. The KCHIP 3 Sample for the Survey of Premium Non-payment

Soon after the introduction of the KCHIP premium, administrators in the Kentucky Cabinet for Health and Family Services requested that we survey families that lost KCHIP coverage due to premium non-payment in order to ascertain why these families chose not to pay the new SCHIP premium and whether or not they obtained an alternative source of health coverage. Surveys were distributed to the universe of families (1,530 families with 2,173 children) that lost SCHIP coverage due to premium non-payment in the first four months after the introduction of the premium (December 2003 – March 2004). Responses were received from 454 families, for a response rate of 30 percent (454 / 1,530). Though the surveys were distributed at the family level, family and child identifiers suggest that these families represent 642 individual children that lost KCHIP coverage.

Table 2 presents demographic information from the KCHIP eligibility records for the children in the responding families, all children from the universe of families surveyed, and the universe of KCHIP enrollees for the month of January 2004. A comparison of children in responding families to children in the universe of families surveyed will provide information as to the extent to which the responding children are representative of all children who lost coverage due to premium non-payment. Children in responding families are more likely to be white, female, younger, and live in a rural location than children in non-responding families, with the racial difference being the largest. These results are comparable to the annual Medicaid surveys in Kentucky and do not appear to indicate significant bias in survey responders.

A comparison of children in the universe of families surveyed to children enrolled in KCHIP in January 2004 will provide some insight into how children that lost coverage

compare to the typical KCHIP III enrollee. Children in families that lost coverage due to premium non-payment are younger, male, more likely to be non-white, and more likely to live in an urban area than the typical KCHIP III enrollee in January 2004. These results from Table 2 are generally consistent with the results from the KCHIP 3 hazard sample presented in Table 1.

III. The Hazard Model and the Survey

A. The Hazard Model

As in Marton (2007), the duration of the KCHIP III enrollment spells described above is estimated using a Cox proportional hazard model with time varying covariates to model the yearly recertification process and the introduction of the premium.[8] Let T_i be the length of child i's KCHIP III enrollment spell. Using this notation, the hazard for child i at time t, $\lambda_i(t)$, is defined as follows:

$$\lim_{h \to 0^+} \frac{prob[t + h > T_i \geq t \mid Ti \geq t]}{h} = \lambda_i(t). \quad (1)$$

The hazard is parameterized using a proportional hazards format:

$$\lambda_i(t) = \lambda_0(t) \exp\{X_i(t)'\beta\}. \quad (2)$$

Here $\lambda_0(t)$ is the baseline hazard at time t, which is unknown. $X_i(t)$ is a vector of time dependent explanatory variables for child i that include dummies for yearly recertification, dummies to capture the short run and the long run impact of the policy change, the demographic and chronic condition indicators described in Table 1, and a series of regional controls. Finally, β is a vector of coefficients associated with the explanatory variables and is unknown. Interactions between the policy change indicators

[8] See Cox (1972) for further discussion and Meyer (1990) for an application to unemployment insurance.

and the chronic condition indicators are included to test whether or not relatively sick children behave differently than healthy children.

Because controls for the recertification process are included in $X_i(t)$, no formal attempt will be made to estimate the baseline hazard $\lambda_0(t)$. Instead, we will use the average monthly exit probability in the KCHIP III sample, 3.18 percent, as an estimate of the average hazard when interpreting the estimated coefficients of the model. In the estimation of the standard errors, we take into account family level correlation between observations. This is essentially the same as controlling for unobserved heterogeneity (or shared frailty) at the family level.

B. The Survey

As mentioned, the 1,530 families with children that lost KCHIP coverage as a result of premium non-payment in the first four months after the introduction of the premium (December 2003 – March 2004) where surveyed via mail in the spring of 2004.[9] The purpose of the survey was to: determine the socio-demographic and health characteristics of the families that did not pay the premium, determine why families did not pay the premium, and to determine the extent to which these children obtained another source of health coverage. In addition, families were asked to indicate whether or not they plan to re-apply for KCHIP coverage, and a question about the child's recent utilization of health services.

The survey methodology consisted of 4 mailings. Families were first sent a pre-survey letter describing the purpose of the survey and to alert the families about the coming survey. One week later each family was sent a survey packet consisting of the survey instrument, a cover letter, and a postage paid return envelope. The following

[9] These families were identified by the contract vendor hired to process premium payments for the State.

week the families were sent a reminder/thank you post card. And finally, after an additional week the non-responders were sent an additional survey packet. The survey was closed two weeks after the last mailing and the survey data was coded into an Access database. Out of the 1,530 surveys sent out, 454 completed surveys were returned, for a response rate of 30 percent. This number is similar to other mail surveys of Medicaid members and is consistent with surveys sent to Medicaid members in Kentucky each year.

The survey instrument was developed by staff at the Kentucky Cabinet for Health and Family Services and the University of Kentucky. The survey was modeled on SCHIP dis-enrollee surveys from other states and the annual Kentucky Medicaid member satisfaction survey. The survey consisted of 10 questions covering 2 pages. The complete survey is attached as Appendix A.

IV. Results

A. Hazard Analysis

Table 3 presents the results of two Cox proportional hazard models explaining the duration of enrollment of spells in KCHIP III. Model 1 is a re-statement of the primary hazard model estimated in Marton (2007), which did not include any health variables.[10] Model 2 updates this primary hazard model by including controls for the three chronic conditions described above and interactions between each chronic condition and the indicator for the short run (3 month) impact of the introduction of the premiums. The hazard rates and absolute effects for the variables included in both models are nearly

[10] There are 9 fewer exits among the same 46,068 KCHIP III spells in Model 2, because we were also given death certificate data when the claims data was provided for this paper. The death certificate data suggested that 9 of the exits originally recorded in Model 1 were due to death, so we re-classified those spells as being right censored. Given that this is such a small number, the results presented in Table 3 are not sensitive to this change.

identical, which suggests that the results presented in Marton (2007) are not being driven by the exclusion of controls for heath type.

As before, Recert 1 is a time varying dummy variable that equals one during the months of an enrollment spell in which children are typically required to complete their first recertification (months 12, 13, and 14). Recert 2 is a time varying dummy variable that equals one during the months associated with the second recertification (months 24, 25, and 26). Although Kentucky does not have a formal 12 month continuous eligibility policy, in practice a large number of the exits and a great deal of the churning between eligibility categories occurs during a child's recertification, rather than during the intermediate 12 months. The short run premium indicator equals one in December 2003, January 2004, and February 2004 and is meant to capture the short run impact of the introduction of the premium. The long run premium indicator is equal to one from March 2004 onward and is used to capture the long run impact.

The hazard rates on these four variables are all greater than one and are statistically significant. This suggests that if a child's enrollment spell lasts until the time period being captured by these variables, then the child is more likely to exit public coverage. Of course, these are relative measures, so it is difficult to interpret their magnitudes. In order to provide a better sense of the magnitude of the effects of the explanatory variables, we calculate an "absolute" effect for each variable. For example, Model 2 suggests that when an average child's spell lasts until the first recertification period the probability of exiting during these three months (12, 13, or 14) is 9.80 percent per month, holding everything else constant. This can be compared to the average monthly exit probability in the KCHIP III sample of 3.18 percent to provide a sense of

size. Thus Model 2 replicates the Model 1 result that recertification has a large impact on the duration of KCHIP III enrollment.

Model 2 also replicates the primary result of interest from Marton (2007) which is that the introduction of premiums has a large statistically significant negative impact on enrollment and that the effect is much stronger in the short run than in the long run. If the average child is enrolled when the premium is introduced, then the probability they exit public coverage in each of the next three months in Model 2 is 8.29 percent, holding everything else constant.[11] The associated long run premium dummy suggests that if they remain enrolled during the first three months after the premium is introduced, then they have a 3.61 percent chance of exiting in each of the subsequent six months, holding everything else constant.

The absolute effects associated with these new chronic condition indicators in Model 2 provide information about the impact of health status on the duration of KCHIP III enrollment. Children with either diabetes, asthma, or a mental health condition are statistically significantly less likely to exit KCHIP III than children without any of these chronic conditions. For example, the monthly probability of exiting public coverage for a child with diabetes is 1.55 percent while the average child in the sample has a monthly probability of exiting of 3.18 percent. If one of the goals of the SCHIP program is to provide coverage for children with chronic conditions that may not have access to private health insurance, than the finding that they are generally less likely to exit shows that the program may be making progress in achieving this goal. These results for Kentucky are

[11] The absolute effect for the short run premium indicator combines the hazard associated with the short run premium indicator and the hazards for the three interaction terms between the short run premium indicator and the chronic condition indicators.

consistent with results found in the Shenkman et al. (2002) and the Herndon et al. (2006) studies of Florida SCHIP recipients.

Given that relatively less healthy children exit public coverage at a lower rate than relatively healthy children, we now turn to the question of whether or not the introduction of the premium had a differential impact on the enrollment of less healthy children. There may be some concern that premiums may drive out children that "need" the coverage the most. We test this hypothesis by including an interaction term between each chronic condition indicator and the short run policy change indicator. A hazard greater than one associated with any of the interaction terms suggests that the premium increases the rate at which children with that particular chronic condition leave public coverage to a greater degree than for children without that condition. The interaction hazards in Model 2 for asthma and mental health conditions are not significantly different from one, while the interaction hazard for diabetes is greater than one with a p-value of just under 10 percent (.095). We cannot reject the joint hypothesis that as a group the interaction hazards are not significantly different from one. Thus while one of the interaction hazards is marginally individually significant, they are not significant as a group. The strongest interpretation we are willing to give this is "very weak" evidence that premiums disproportionately impact the enrollment of relatively less healthy children in a negative way. The survey results described below suggest that conditional upon exiting public coverage, relatively less healthy children are more likely to have an alternative source of insurance coverage than relatively more healthy children. Therefore, even if premiums increase the exit rate of diabetics to a larger degree than non-diabetics, this finding alone may implicitly overstate the net effect on their insurance coverage if diabetic children are more likely to acquire private coverage.

The KCHIP III spells analyzed in both Models 1 and 2 do not treat transfers to other public coverage as exits from KCHIP III. Many times researchers are not able to track children in state administrative databases as they move between programs, so they are forced to ignore such transfers. Another main result of Marton (2007) is that ignoring such transfers can lead to an overstatement of the impact of premiums on the duration of enrollment. In order to see whether or not the inclusion of health status indicators has any impact on this result, Model 3 re-estimates Model 2 without considering transfers to other public coverage. Table 4 re-states Model 2 and presents Model 3 beside it. Note that Model 3 contains many more exits (33,858 vs. 19,670) among the 46,068 KCHIP III spells. These additional exits are actually transfers to KCHIP II or Medicaid, so if we were not able to track children as they churn between eligibility categories our data would paint a different picture of the duration of enrollment in public coverage. Many of the children we would define as exiting are actually maintaining coverage. For these reasons, the absolute effects and the average monthly exit probability are higher in Model 3 than in Model 2.

How does this change in spell definition impact the findings for the chronic condition indicators? In Model 3, the absolute effects associated with the diabetes and asthma indicators still suggest that children with these chronic conditions are less likely to exit, though the relative magnitude of the effects are smaller. The absolute effect associated with the mental health indicator suggests that these children are more likely to exit. These differences (as compared to Model 2) are due to the fact that in Model 3 we are not observing when children with these chronic conditions transfer from KCHIP III into another eligibility category. Instead when they transfer we treat them as losing coverage. If these children are more likely to transfer than healthy children (or stay

enrolled longer after transferring), then this approach would understate the difference in enrollment duration between children with chronic conditions and healthy children, thus pushing the hazard rates for the chronic condition indicators up.[12]

The interaction terms associated with the chronic condition indicators in Model 3 suggest that premiums reduced the exit rate of children with chronic conditions to a greater degree than healthy children. This could perhaps be explained if there was a reduction in the number of children with chronic conditions that were moving between eligibility categories after the introduction of the premium. Given that there is now a meaningful financial difference between the eligibility categories, it may be more difficult or take more time for children in KCHIP III to transfer into KCHIP II or Medicaid. If that is true and we expect children with chronic conditions are more likely to attempt maintain public coverage, then one might imagine that children with chronic conditions are more likely to stay in KCHIP III, though the overall public coverage of children with chronic conditions is not changing because that just means fewer are transferring to other eligibility categories. If we could not observe such a reduction in transfers (as in Model 3), then it would look like the overall public coverage of children with chronic conditions is increasing relative to healthy children, when in fact it is

[12] Consider the following simple example of three children that start KCHIP III spells in the same month. Suppose child A is healthy and has 12 months of KCHIP III coverage before exiting public coverage completely. Now suppose child B has asthma or diabetes and has 13 months of KCHIP III coverage before transferring to Medicaid for another 10 months and then leaving public coverage completely. Finally, suppose child C has a mental health condition and has 3 months of KCHIP III coverage before transferring to Medicaid for 20 months and then leaving public coverage completely. According to the spell definition used in Model 2, child A has a 12 month spell, while children B and C both have 23 month spells. This would suggest that children with chronic conditions are less likely to exit coverage than healthy children. According to the spell definition used in Model 3, child A has a 12 month spell, child B has a 13 month spell, and child C has a 3 month spell. This would suggest that children with asthma or diabetes are slightly less likely to exit coverage than healthy children and children with a mental health condition are more likely to exit.

staying the same. The chronically ill children are just distributing themselves across the eligibility categories differently.

The addition of the chronic condition indicators reinforces the result that there are important differences in interpretation between models of enrollment duration that include transfers to other public coverage and models that do not. Ignoring these transfers may lead researchers to understate the additional length of a typical enrollment spell for relatively less healthy children as compared to healthy children. It may also lead researchers to overstate the extent to which relatively less healthy children remain in public coverage as compared to healthy children after the introduction of a policy change such as a premium.

The final piece of analysis presented in Marton (2007) addressed the issue of causality by performing the same analysis done for the KCHIP III sample on a similarly defined sample of KCHIP II children. Because KCHIP II was established as a Medicaid-expansion, premiums may not be charged in this eligibility category without a federal wavier. Thus, ignoring income differences, if KCHIP II children are relatively similar to KCHIP III children (other than the fact that they don't face premiums) then they serve as naturally defined a control group with which to assess whether or not the changes that occurred in KCHIP III enrollment are caused by the new premium. Table 5 presents descriptive statistics for the KCHIP II sample with the descriptive statistics for the KCHIP III sample. Comparing the chronic condition indicators, the differences between the two eligibility categories are not great, though the differences reported are statistically significant.

Table 6 again re-states Model 2 on the left and on the right presents the results of the same model estimated on the KCHIP II sample. In both models, the chronic

condition absolute effects are below the average hazard and are statistically significant. In addition, in each model one of the chronic condition interaction hazards is significantly greater than one, though in both the chronic condition interaction hazards are not jointly significant. The addition of the chronic condition indicators does not change the result from Marton (2007) that there does not seem to be much of an effect of the premium on KCHIP II enrollment. The absolute effect associated with the short run policy change indicator (2.47 percent) is almost identical to the average hazard (2.27 percent) for the KCHIP II sample when the short run policy change indicator is interacted with the chronic condition indicators. This implies that the addition of the chronic condition indicators does not change the causal interpretation of the results of the KCHIP III analysis presented in Model 2 and in Marton (2007).

B. The Survey

Table 7 reports results from survey question 5, which allows responding families to choose a reason why they did not pay the premium. About 43 percent ((40 + 153) / 454 – question 5) of responding families report that they could not afford to pay the premium, with the remainder reporting process-type issues for non-payment. About 20 percent (92 / 454 – question 5) of families report paying the premium too late, 4 percent (19 / 454 – question 5) report problems with the billing process, and 2 percent (9 / 454 – question 5) report problems with the application process. Some 8 percent (35 / 454 – question 5) of families did not understand why they had to pay the premium, which may signal confusion as to which eligibility category their child is covered under (KCHIP vs. Medicaid). Overall, affordability is the most common reason for dropping coverage, with almost half of responding families citing this reason.

Table 8 reports results from survey question 8, which addresses alternative insurance options by asking families if any adults in the household have employer-provided insurance coverage. Roughly 49 percent ((151+73) / 454 – question 7) of responding families report that at least one parent or spouse has either single (33 percent) or family (16 percent) coverage through their employer. Therefore it appears that 16 percent of responding families can substitute employer-provided coverage for their child's lost KCHIP coverage.[13] By using responses to survey question 11 (which asks about recent health care usage) as a proxy for health status, we can decompose the answer to question 8 between those children that had a recent provider visit in the last 6 months and those children that did not. These results are also presented in Table 8 and suggest that families of children with a recent health care visit are more likely to have employer-provided health coverage in general and more likely to have family coverage as well.

Table 9 reports data from question 9 of the survey, an alternative question looking at what type of health insurance the families currently have (after losing KCHIP coverage). Overall, the results show that about 53 percent ((99 + 9 + 32 + 89 + 13) / 454 – question 9) of responding families found other insurance coverage. About 24 percent ((99 + 9) / 454 – question 9) of families report having private (non-public) insurance, 7 percent (32 / 454 – question 9) of families report Medicaid coverage, 20 percent (89 / 454 – question 9) of families report returning to the KCHIP program (perhaps many of those that reported paying their premium too late, since Kentucky does not have a formal blackout period), and 3 percent (13 /454 – question 9) report some other insurance product. If we again use question 11 as a proxy for health status and decompose the

[13] Discuss crowd-out literature here.

answers to question 9, we find that families who report using health care in the past 6 months are more likely to have insurance coverage of some kind.

Therefore, the survey responses to questions 8 and 9 suggest that many families are able to find alternative sources of insurance coverage after losing KCHIP coverage for their children. This may suggest that families with better outside insurance options may be the ones that are more likely to exit the KCHIP program when premiums are introduced. In addition, survey responses to question 11 suggest that less healthy children are actually somewhat more likely to be covered under an alternative source of insurance after losing KCHIP coverage. Thus this is suggestive evidence that less healthy children may not be disproportionately negatively affected by a loss in KCHIP coverage when compared to more healthy children. This is generally consistent with our hazard analysis where we at best only found very weak evidence that relatively less healthy children were disproportionately affected by the introduction of the new premium.

V. Conclusion

The purpose of this paper is to extend the analysis of the impact of SCHIP premiums presented in Marton (2007) by using new data sources that are often not available to researchers to address whether or not relatively sick children are differentially impacted by the introduction of premiums and the extent to which families of children that lose public coverage as a result of premium non-payment are able to find alternative sources of insurance for their children. In order to address the first question, we use Medicaid / SCHIP claims data from Kentucky to create indicators for diabetes, asthma, and mental health conditions for sample of children analyzed in Marton (2007) and estimate hazard models with interactions between the chronic health conditions and

the policy change indicators. To address the second question, we surveyed all families that lost SCHIP coverage in Kentucky in the first four months following the introduction of the premium and asked about alternative sources of health coverage.

The hazard analysis suggests that children with chronic conditions are generally less likely to leave public coverage than children without such conditions, perhaps because their families find the coverage more valuable. We find at best only very weak evidence that the enrollment of children with chronic conditions is differentially negatively impacted by premiums. Given this very weak evidence, it is relatively safe to say that children with chronic conditions, while more likely to remain enrolled in general, do not respond differently to the introduction of a premium than do children without a chronic condition. We also find that being able to track children when they transfer from SCHIP into Medicaid is very important to properly understand the impact of premium changes. Failure to account for these transfers may lead researchers to understate the extent to which relatively sick children remain enrolled as compared to healthy children and overstate the extent to which families of relatively sick children respond to new premiums by increasing the rate at which their children remain enrolled in public coverage.[14] The survey responses suggest that many families that lost coverage due to premium non-payment are finding alternative sources of insurance coverage. In addition, this appears to be more likely the case for relatively sick children as compared to healthy children.

If society values the health insurance consumption of relatively less healthy children, then these results should be seen as generally positive ones. We find that

[14] An alternative approach, and one that will be the subject of future research (see Butler and Marton (2007)), is to model exits from the premium-paying SCHIP eligibility category using a competing hazards framework. In this framework separate hazards are estimated for movements to non-premium-paying SCHIP, Medicaid, and for exits due to non-payment of the premium.

children with chronic conditions are generally more likely to remain enrolled in public coverage than healthy children (though the rate at which they remain enrolled is not 100 percent). Some may fear that the introduction of public premiums may cause the most vulnerable children to lose coverage, but we don't find strong evidence of this in our hazard analysis. Because many (though not all) families that lost coverage due to premium non-payment found an alternative source of health coverage, it may be the case that families with the best outside options are the ones that leave public coverage, rather than the most vulnerable. Of course, if the most vulnerable children are the ones that remain enrolled then the incidence of these new premiums falls heavily upon their families.

We can list many reasons why increases in cost sharing for Medicaid and SCHIP recipients may become more attractive for state governments in the future. Changes in the federal versus state "assignment" of power to authorize the collection of public premiums (as is seen in the DRA, the design of the SCHIP program, and many state Medicaid waiver programs) give states more flexibility to implement such a policy change.[15] The results presented in this paper should be useful as states consider the impact of the introduction of (or increases) in public premiums on the insurance coverage of relatively less healthy children and their families.

[15] For discussion of the Federalism issues associated with public insurance programs, see Marton and Wildasin (2007a, 2007b).

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Table 1: Descriptive Statistics for Children in the KCHIP III Hazard Model Sample

KCHIP III Demographic:	All Children / Spells	Spells Ending in Nonpayment	Spells Ending for Other Reason	Right Censored Spells
# spells / children	46,068	4,045 (9%)	15,625 (34%)	26,389 (57%)
% Aged 1-5	36%	35%	39%	35%
% Aged 6-12	37%	38%	34%	38%
% Aged 13-18	27%	27%	27%	27%
% Female	48%	48%	48%	49%
% Non-white	12%	16%	13%	12%
Avg. # of Siblings	1.15	1.13	1.11	1.18
% in Managed Care	24%	29%	24%	22%
Avg. Spell Length	13.42	9.11	10.81	15.62
% From No Public Coverage	29%	37%	33%	26%
% From Medicaid	41%	37%	42%	41%
% From KCHIP II	30%	26%	25%	33%
% Diabetic	1%	0%	0%	1%
% Asthmatic	14%	11%	10%	17%
% Mental Health	21%	19%	16%	24%

- Note that all differences across the three groups are statistically significant at 1% except for % female and % aged 13-18.

Table 2: Descriptive Statistics for Children in the KCHIP III Non-payment Survey

KCHIP III Demographic:	Children that Responded to the Survey	Universe of Children Surveyed	Universe of KCHIP III Enrollees in January 2004
# children	642	2,173	51,670
% Aged 1 to 5	36.9%	34.1%	14.3%
% Aged 6 to 10	21.7%	23.2%	30.1%
% Aged 11 to 19	41.4%	42.6%	55.6%
% Female	48.8%	47.7%	48.6%
% White	84.7%	79.3%	86.6%
% African American	9.2%	13.9%	10.5%
% Hispanic	3.6%	4.0%	1.9%
% Rural	74.5%	72.8%	77.7%

- Note that this demographic data is obtained from the Kentucky Medicaid eligibility information system by matching the identification numbers of the children in the families surveyed to their eligibility records and is the most recent available data as of January 2004.

Table 3: Cox Proportional Hazard Models for KCHIP III (with and without chronic condition indicators)

Dependent Variable: Length of KCHIP III Enrollment Spell

	Model 1: Main Model - Marton (2007) transfers to other public coverage included in KCHIP III spell			**Model 2: Adds Chronic Conditions** transfers to other public coverage included in KCHIP III spell		
Variables	**Hazard Rate**	**S.E.**	**Abs Effect**	**Hazard Rate**	**S.E.**	**Abs Effect**
Program Structure Variables						
Recert 1	3.08 ***	0.14	9.79%	3.08 ***	0.14	9.80%
Recert 2	2.09 ***	0.18	6.64%	2.09 ***	0.18	6.64%
SR 3 months	2.59 ***	0.06	8.25%	2.61 ***	0.07	8.29%
LR 6 months	1.13 ***	0.03	3.59%	1.13 ***	0.03	3.61%
Other Demographics						
# of siblings	0.96 ***	0.01	3.05%	0.94 ***	0.01	2.99%
Female	0.99	0.01	3.17%	0.96 ***	0.01	3.05%
Non-white	1.01	0.03	3.21%	1.01	0.03	3.21%
Age 1 to 5	0.92 ***	0.02	2.92%	0.92 ***	0.02	2.94%
Age 6 to 12	0.81 ***	0.02	2.57%	0.82 ***	0.02	2.61%
Managed Care	0.83	0.15	2.63%	0.80	0.15	2.56%
From KCHIP II	0.83 ***	0.02	2.63%	0.86 ***	0.02	2.73%
From Medicaid	0.92 ***	0.02	2.92%	0.96 *	0.02	3.06%
Monthly Unemployment Rate	1.00	0.00	3.18%	1.00	0.00	3.18%
Chronic Conditions & Interactions						
Diabetes				0.46 ***	0.06	1.55%
Asthma				0.67 ***	0.02	2.11%
Mental Health				0.66 ***	0.02	2.09%
Diabetes int SR				1.47 *	0.34	
Asthma int SR				0.94	0.05	
Mental int SR				1.02	0.05	
# of exits	19,679			19,670		
# of spells	46,068			46,068		
Avg. Monthly Exit Probability	3.18%			3.18%		
Log likelihood	-196,613			-196,047		

- Controls for region of residence are included but not presented.
- Standard Errors are adjusted for family level correlation.

* = underlying beta significant at 10%
** = underlying beta significant at 5%
*** = underlying beta significant at 1%

Table 4: Cox Proportional Hazard Models for KCHIP III (with two spell definitions)

Dependent Variable: Length of KCHIP III Enrollment Spell

	Model 2: Adds Chronic Conditions transfers included in KCHIP III spell (repeated from Table 3)			**Model 3: Adds Chronic Conditions** transfers to other public coverage **NOT** included in KCHIP III spell		
Variables	**Hazard Rate**	**S.E.**	**Abs Effect**	**Hazard Rate**	**S.E.**	**Abs Effect**
Program Structure Variables						
Recert 1	3.08 ***	0.14	9.80%	2.84 ***	0.11	24.49%
Recert 2	2.09 ***	0.18	6.64%	2.35 ***	0.25	20.30%
SR 3 months	2.61 ***	0.07	8.29%	2.00 ***	0.04	16.56%
LR 6 months	1.13 ***	0.03	3.61%	0.94 ***	0.02	8.14%
Other Demographics						
# of siblings	0.94 ***	0.01	2.99%	1.07 ***	0.01	9.24%
Female	0.96 ***	0.01	3.05%	1.00	0.01	8.63%
Non-white	1.01	0.03	3.21%	1.13 ***	0.03	9.73%
Age 1 to 5	0.92 ***	0.02	2.94%	1.11 ***	0.02	9.58%
Age 6 to 12	0.82 ***	0.02	2.61%	0.96 ***	0.01	8.27%
Managed Care	0.80	0.15	2.56%	1.25 *	0.16	10.77%
From KCHIP II	0.86 ***	0.02	2.73%	1.21 ***	0.02	10.49%
From Medicaid	0.96 *	0.02	3.06%	1.53 ***	0.03	13.21%
Monthly Unemployment Rate	1.00	0.00	3.18%	1.00 ***	0.00	8.62%
Chronic Conditions & Interactions						
Diabetes	0.46 ***	0.06	1.55%	0.79 ***	0.06	6.76%
Asthma	0.67 ***	0.02	2.11%	0.97 *	0.02	8.24%
Mental Health	0.66 ***	0.02	2.09%	1.09 ***	0.02	9.26%
Diabetes int SR	1.47 *	0.34		0.93	0.15	
Asthma int SR	0.94	0.05		0.89 ***	0.04	
Mental int SR	1.02	0.05		0.89 ***	0.03	
# of exits	19,670			33,858		
# of spells	46,068			46,068		
Avg. Monthly Exit Probability	3.18%			8.64%		
Log likelihood	-196,047			-332,179		

- Controls for region of residence are included but not presented.
- Standard Errors are adjusted for family level correlation.

* = underlying beta significant at 10%
** = underlying beta significant at 5%
*** = underlying beta significant at 1%

Table 5: Comparing KCHIP III Spells with KCHIP II Spells

Demographic:	KCHIP III Spells	KCHIP II Spells
# spells / children	46,068	82,839
% Aged 1-5	36%	17%
% Aged 6-12	37%	52%
% Aged 13-18	27%	31%
% Female	48%	49%
% Non-white	12%	15%
Avg. # of Siblings	1.15	1.31
% in Managed Care	24%	24%
Avg. Spell Length	13.42	14.12
% From No Public Coverage	29%	28%
% From Medicaid	41%	60%
% From "Other" KCHIP	30%	12%
% Diabetic	1%	1%
% Asthmatic	14%	13%
% Mental Health	21%	25%

- Note that the all differences are statistically significant at 1% except for % female.

Table 6: Cox Proportional Hazard Models for KCHIP III and KCHIP II

Dependent Variable: Length of Enrollment Spell in the Respective Program

	Model 2: Adds Chronic Conditions for KCHIP III Spells transfers included in KCHIP III spell (repeated from Table 3)			**Model 4: Adds Chronic Conditions for KCHIP II Spells** transfers included in KCHIP II spell		
Variables	**Hazard Rate**	**S.E.**	**Abs Effect**	**Hazard Rate**	**S.E.**	**Abs Effect**
Program Structure Variables						
Recert 1	3.08 ***	0.14	9.80%	3.67 ***	0.15	8.33%
Recert 2	2.09 ***	0.18	6.64%	2.02 ***	0.14	4.59%
SR 3 months	2.61 ***	0.07	8.29%	1.07 **	0.03	2.47%
LR 6 months	1.13 ***	0.03	3.61%	0.76 ***	0.02	1.72%
Other Demographics						
# of siblings	0.94 ***	0.01	2.99%	0.96 ***	0.01	2.18%
Female	0.96 ***	0.01	3.05%	0.97 **	0.01	2.21%
Non-white	1.01	0.03	3.21%	0.97	0.02	2.20%
Age 1 to 5	0.92 ***	0.02	2.94%	0.99	0.02	2.24%
Age 6 to 12	0.82 ***	0.02	2.61%	0.82 ***	0.01	1.87%
Managed Care	0.80	0.15	2.56%	1.11	0.15	2.52%
From KCHIP II	0.86 ***	0.02	2.73%	1.06 **	0.03	2.40%
From Medicaid	0.96 *	0.02	3.06%	0.88 ***	0.02	2.00%
Monthly Unemployment Rate	1.00	0.00	3.18%	0.99 ***	0.00	2.26%
Chronic Conditions & Interactions						
Diabetes	0.46 ***	0.06	1.55%	0.63 ***	0.06	1.40%
Asthma	0.67 ***	0.02	2.11%	0.62 ***	0.02	1.44%
Mental Health	0.66 ***	0.02	2.09%	0.67 ***	0.01	1.52%
Diabetes int SR	1.47 *	0.34		0.88	0.21	
Asthma int SR	0.94	0.05		1.14 **	0.07	
Mental int SR	1.02	0.05		1.00	0.04	
# of exits	19,670			26,588		
# of spells	46,068			82,839		
Avg. Monthly Exit Probability	3.18%			2.27%		
Log likelihood	-196,047			-281,326		

- Controls for region of residence are included but not presented.
- Standard Errors are adjusted for family level correlation.

* = underlying beta significant at 10%
** = underlying beta significant at 5%
*** = underlying beta significant at 1%

Table 7: Survey Responses to Question 5

Q5. Reason for not paying the premium.	n %
Lost job, couldn't afford to pay	40 (10%)
Too many expenses, couldn't afford to pay	153 (37%)
Paid bill too late	92 (22%)
Did not know why I had to pay	35 (9%)
Problems with application process	9 (2%)
Problems with the billing process	19 (5%)
Got other health insurance	15 (4%)
No longer eligible	10 (2%)
Other	38 (9%)
Total	411

Table 8: Survey Responses to Question 8

		Controlling for thoose members using health services in the past 6 months	
Q8. Does any parent or spouse have health coverage through an employer?		Used Doctor or health provider in the last 6 months (from Q. 11)	
	All	Yes	No
No	223	124	97
	50%	48%	55%
Yes, single coverage	151	82	63
	34%	31%	36%
Yes, family coverage	73	55	15
	16%	21%	9%
Total	447	261	175

Table 9: Survey Responses to Question 9

		Controlling for thoose members using health services in the past 6 months	
Q 9. What type of health insurance is your family enrolled in now?		Used Doctor or health provider in the last 6 months (from Q. 11)	
	All	Yes	No
Group insurance through parents' work	99	70	28
	23%	27%	17%
Private insurance from insurance company	9	7	2
	2%	3%	1%
Medicaid	32	24	8
	7%	9%	5%
KCHIP	89	50	36
	21%	19%	21%
Other	13	8	5
	3%	3%	3%
None	192	100	90
	44%	39%	53%
Total	434	259	169

Appendix A: The KCHIP III Premium Non-payment Survey

(Include the survey in the following pages by converting this file to a .pdf and then merging the survey .pdf file)

Appendix B: ICD-9 Codes 290-319

290	SENILE/PRESENILE PSYCHOS
291	ALCOHOLIC PSYCHOSES
292	DRUG PSYCHOSES
293	TRANSIENT ORG MENTAL DIS
294	OTHER ORGANIC PSYCH COND
295	SCHIZOPHRENIC DISORDERS
296	AFFECTIVE PSYCHOSES
297	PARANOID STATES
298	OTH NONORGANIC PSYCHOSES
299	PSYCHOSES OF CHILDHOOD
300	NEUROTIC DISORDERS
301	PERSONALITY DISORDERS
302	SEXUAL DISORDERS
303	ALCOHOL DEPENDENCE SYNDR
304	DRUG DEPENDENCE
305	NONDEPENDENT DRUG ABUSE
306	PSYCHOPHYSIOLOGIC DIS
307	SPECIAL SYMPTOM NEC
308	ACUTE REACTION TO STRESS
309	ADJUSTMENT REACTION
310	NONPSYCHOTIC BRAIN SYND
311	DEPRESSIVE DISORDER NEC
312	CONDUCT DISTURBANCE NEC
313	EMOTIONAL DIS CHILD/ADOL
314	HYPERKINETIC SYNDROME
315	SPECIFIC DEVELOP DELAYS
316	PSYCHIC FACTOR W OTH DIS
317	MILD MENTAL RETARDATION
318	OTHER MENTAL RETARDATION
319	MENTAL RETARDATION NOS