

Human Capital and the Supply of Religion*

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Abstract: We study the role of labor inputs in the production of religion using comprehensive data on every Oklahoma Methodist congregation during 1961-2003. Pastors have large effects on church growth: replacing a 25th percentile pastor with a 75th percentile one increases annual attendance growth by three percent, similar to the effect of a ten percent increase in the surrounding county's population. A pastor's performance in his first church – which is largely the result of random assignment – is strongly predictive of his performance in future congregations, suggesting a causal effect of pastors on church growth. Moreover, the movement of pastors within the Oklahoma ministry is consistent with efficient use of labor resources: low-performing pastors are much more likely to be rotated, consistent with a model of pastor-church matching. Additionally, high-performing pastors are moved to larger congregations, and low-performing pastors are more likely to exit the sample.

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I. Introduction

Religion plays a central role in the lives of many, even in the modern world. A significant majority of the world's population remains affiliated with a major religion (*CIA Factbook*, 2012), and a 2009 Gallup survey involving 143 countries indicates that it “plays an important part [in the] daily lives” of over 80 percent of respondents.¹ Moreover, whether by promoting education (Becker and Woessmann (2009)), maintaining ethical systems (Weber (1905), McCleary and Barro (2006)), or fostering subjective well-being (Ellison (1991)) religion has been associated – if not credited – with a variety of welfare improvements. Over a third of U.S. charitable contributions go to religious organizations, greater than \$100 billion in 2008 (Giving USA, 2009). Given its broad and deep impact on the economy and society, economists have increasingly sought to understand what motivates individuals to devote resources to religious activities, versus their secular alternatives.

In this paper, we provide an analysis of the *production* side of religious attendance utilizing a unique human resource database from the United Methodist Church of Oklahoma.² Whereas other research focusing on the supply side of religion has considered the effects of market structure and regulation, we believe we are the first to look within the church organization to analyze the determinants of religious participation.

Using internal records from every Methodist congregation in Oklahoma during 1961-2003, we estimate the role of individual pastors in religious participation. Because

¹ <http://www.gallup.com/poll/114211/Alabamians-Iranians-Common.aspx>

² While the formal title of the denomination is “United Methodist” since 1969, we use “Methodist” for ease of exposition.

Methodist pastors are typically assigned to serve at several churches (within Oklahoma) over their careers, we may observe the same church over the tenure of several pastors, and the same pastor over several different churches, allowing for credible identification of pastor effects on church performance.

There is good reason to focus on labor inputs into religious attendance. In the economics of organizations literature, there is an emerging body of work that finds a critical role of managers and leaders for organizational productivity (see, in particular, Lazear et al. (2011) and Mollick (2011)). One might expect this to extend to religion: Largely independently run congregations have grown into the tens of thousands, and their leaders – ‘superstar’ pastors like Joel Osteen and Rick Warren – are widely viewed as essential to their successes.³

In this paper, we document the impact of pastors on attendance growth, our primary measure of pastor success in furthering the church’s mission. Further, given that we find pastors to be important determinants of church growth, we then ask whether the Methodist church utilizes pastors in a way that is consistent with attendance maximization.

Our findings may be summarized as follows: Using the empirical Bayes methodology to assess the performance contributions of individual pastors, we find that they collectively play an important role in church growth. Our estimates imply that replacing a 25th percentile pastor with a 75th percentile one increases annual attendance growth by three percent, similar to the effect of a ten percent increase in the surrounding county’s population. The inter-quartile range of pastor effects is 0.15 of a

³ See, for example, http://www.forbes.com/2003/09/17/cz_lk_0917megachurch.html.

standard deviation in attendance growth, a magnitude comparable to the impact of individual teachers on student performance (e.g., Rockoff (2004)), which to date has been the primary application of the empirical Bayes method in economics. Moreover, we find that pastors are important in both small and large churches, and further that performance in small congregations is correlated with performance in larger ones. This result is surprising if personal contact with parishioners is crucial for a pastor's success; on the other hand, many of a pastor's activities (e.g., giving sermons) scale easily, suggesting that these latter skills drive the relation between specific pastors and performance.

An important caveat to these results is that pastors and churches are not matched randomly, a problem shared with almost all studies that attempt to estimate individual employee productivity.⁴ As a result, there may be omitted variables that influence both a church's future growth and the pastor it receives, producing a correlation between specific pastors and church performance for reasons unrelated to pastor quality. Additionally, pastor-church matching effects, as in Abowd et al. (1999)), complicate the interpretation of the pastor fixed-effects, since it conflates average quality with improved match quality over time.

We address this concern by using a pastor's *first* church assignment, when information about his capabilities is extremely limited, to obtain quasi-exogenous measures of pastor ability. We estimate each pastor's 'excess' performance during his first assignment, and then use this residual to predict performance in *subsequent* churches, where correlation between pastor assignments and omitted determinants of

⁴ For a discussion of this issue in the context of estimates CEO fixed effects on firm performance, see Bertrand and Schoar (2003).

church growth are likely more problematic. We find that a pastor's first-church performance residual is strongly linked to his subsequent performance, and that the effect is concentrated almost entirely in the initial years of each subsequent church placement. We argue that unobservable determinants of church growth are unlikely to exhibit this sort of punctuated time series pattern, and thus represent our strongest evidence of a causal link between pastor quality and church performance.

Given the significant and persistent effects of pastors, we conclude by examining how the Oklahoma Conference utilizes past performance in making pastor appointments. We find that underperforming pastors are rotated earlier to new churches, or exit the sample entirely, consistent with the church bureaucracy searching for better matches and the attrition of low-performing pastors. For those remaining in the sample, we find little evidence of performance improvements across congregations or across years within a given pastor-church match, suggesting that pastor learning and better match quality over time play limited roles in explaining pastor productivity. Finally, given the apparent scalability of pastor ability in larger congregations, an attendance-maximizing church bureaucracy should appoint high-performing pastors to larger churches. Consistent with this view, we find that lagged residual attendance growth for a pastor is predictive of church size at future assignments. Our evidence thus broadly favors a view of the Oklahoma United Methodist Conference as utilizing pastor ability to maximize overall attendance growth.

The primary contribution of this paper is to provide what we believe to be the first microeconomic analysis of religiosity by utilizing individual-level data from the Methodist Church – a crucial step forward in understanding religiosity, given the importance often ascribed to the “production” side of religion.

Most prior empirical work in the economics of religion has focused on the “consumer” side of religiosity. Azzi and Ehrenberg (1975) provided the first theoretical framework for religious participation, framed as a household production problem. Religious activity increases until the marginal cost of time or money offsets the marginal benefit, be it in this life (e.g., social value) or the next. A number of studies provide empirical support for this framework. For example, church attendance follows a U-shaped profile with age (Neuman (1986)), and falls when statutes that forbid Sunday shopping are repealed (Gruber and Hungerman (2008)); both patterns are consistent with opportunity costs influencing religious decisions.

We are certainly not the first to consider the supply-side determinants of religiosity. Finke and Stark (1992), for example, credit the growth of some congregations over others – such as Baptist over Episcopal – to superior incentive schemes. In earlier work using the same data employed in this paper, Hartzell, Parsons, and Yermack (2010) show that Methodist pastors’ pay is sensitive to performance. Much of the supply-side literature has focused on market-wide considerations, in particular the role of market structure and government regulation in predicting religiosity (see, for example, Barro and McCleary (2006)). Our work suggests that it is also important to consider intra-organizational dynamics in understanding the productivity of religious organizations. Our findings on the scalability of pastor ability may additionally provide some empirical grounding for the mega-church phenomenon, as it suggests the presence of possible superstar effects in the spirit of Rosen (1981).

Finally, we contribute to the emerging literature in personnel economics that tries to understand the role of individual managers in explaining residual organizational performance. Beyond examining a particularly important application in this paper, our

data are well-suited to the task of analyzing individual contributions to organizational performance given the high frequency of rotation across churches, and the long panel of pastors that we employ.

The rest of this paper is organized as follows: Section II provides some background on the Methodist church in Oklahoma. Section III provides a description of the data. Section IV provides evidence that human capital in the Methodist church is important, describing both our empirical framework and providing estimates of pastor-specific impacts on church productivity. Section V then considers how the Methodist church allocates human capital, analyzing pastor rotation and exit across churches and over time. Section VI concludes.

II. Institutional background

The Methodist church is the second largest Protestant church in the U.S., with 7.77 million members domestically as of late 2011.⁵ Founded originally by John and George Wesley as a “methodological” offshoot of the Anglican Church, Methodists first appeared in the U.S. in the late 1700s. The Methodists take their cue from Matthew (28:19-20), where Jesus tells his followers: “Go therefore and make disciples of all nations, baptizing them in the name of the Father and of the Son and of the Holy Spirit, and teaching them to obey everything that I have commanded you to attract disciples.”

The Methodists have embraced this “Great Commission” and focus on finding new members, primarily through “disciple making” in local churches.⁶ Reflecting this stated objective, we take growth in attendance as our primary measure of pastor

⁵ 2011 Yearbook of American and Canadian Churches.

⁶ http://www.umc.org/site/c.lwL4KnN1LtH/b.2295473/k.7034/Mission_and_Ministry.htm, accessed December, 2011.

performance. By adding new attendees, a pastor generates a stream of future benefits to the church in the form of revenues and participation in church services and activities.

The basic unit of organization in the Methodist church is a *conference*, of which 63 exist within the United States. Conferences are often organized by state – as is the case for Oklahoma – but there are exceptions; large states are sometimes partitioned into multiple conferences, and likewise, conferences can span several smaller states. A single bishop governs each conference.⁷ Conferences are further split into districts, each headed by a superintendent who is appointed by the bishop to a six year term. Oklahoma has 12 districts, each comprised of 35 to 75 local churches.

All Methodist congregations have a single “senior” or “head” pastor. The pastor’s most visible contribution is the delivery of prepared remarks (a sermon) on Sundays, although numerous other tasks fall under his control. These include administrative obligations, such as oversight of the church’s finances, building campaigns, and clerical personnel. In addition, our communication with the Oklahoma Conference reveals that the bulk of a pastor’s time is spent interacting with church members – visiting hospitals, taking food to the elderly or infirmed, providing marriage or divorce counseling, presiding over funerals, speaking at graduations, and so forth.⁸

Unlike many competing sects such as Presbyterians or Baptists, where pastors are free to move across churches at will, pastor assignment in the Methodist church is governed centrally by the conference, specifically the bishop. Indeed, a primary function of the conference hierarchy, perhaps its most important, is to allocate pastors to

⁷ Smaller conferences sometimes share bishops. There are 50 bishops overseeing the 63 conferences within the U.S.

⁸ See *The Book of Discipline of the United Methodist Church* (2008) for a formal description of a Methodist Pastor’s disparate responsibilities.

churches. Usually, Methodist ministers work only for one conference over their careers,⁹ although the typical pastor will serve at several churches in that time.

Ordained pastors are typically hired directly from graduate school (seminary), hired by a particular conference – in our case, the Oklahoma Conference – and assigned to work with a local congregation. Both a pastor’s initial placement and subsequent assignments are determined by the district superintendent and conference bishop, not by individual congregations.¹⁰ Although local churches have some responsibility for setting the pastor’s pay and other aspects of his compensation, they do not directly influence where he serves.

Typically, a pastor is assigned to a single church, but in some cases, he may serve simultaneously at two or more small churches located near one another. Because these so-called circuit churches share a pastor and are often coordinated in other ways, we consider all congregations affiliated with a particular pastor in a given year as a single unit.¹¹ Our results are not sensitive to this aggregation.

⁹ While we do not have the data to test for the frequency of inter-conference movements, our conversations with officials from the Methodist church confirm that such movements are rare.

¹⁰ From our conversations with church leadership, the annual appointment process begins with each pastor and each church's pastor-parish relations committee submitting to the conference respective forms, privately indicating whether each side would prefer that the current pastor stay in place, move, or indifference between the two. The conference takes these responses into consideration when reallocating pastors, but has full authority over both the timing of pastor moves and their destinations. We do not have access to the indicated preferences over moving, just the final outcomes of the conference's decisions.

¹¹ Circuit churches comprise about 25% of our observations. In most cases, circuit composition does not change year-to-year, but they are occasionally recombined – e.g., a given pastor is assigned to churches *A* and *B* in year *t*, but is assigned to churches *A*, *B*, and *C* in year *t+1*. When these occur, we treat recombined circuits as *de novo* assignments.

III. Data

The Methodist Conference of Oklahoma has, since at least 1961, collected detailed annual records on each congregation including data on its membership, attendance, finances, personnel, and other activities. The causes of membership changes are also detailed, with records on changes occurring, for example, via baptisms and members' deaths. Our main performance measure is the change in the average weekly attendance at all Sunday worship services. This variable is one of several pieces of information that the conference requires each local congregation to report annually, along with data such as average participation in Sunday school (e.g., weekly Bible study classes and children's education programs), and attendance in youth programs. The main financial variables include a rough balance sheet, pastor pay (salary and expense allowances), donations to foreign missions, and building expenditures. Importantly, church personnel – specifically the church's head minister – are identified by full name, allowing us to track specific ministers over their careers with the Oklahoma Conference.

These data are assembled and housed centrally at conference headquarters in Oklahoma City. In 2004, we were granted access to the Oklahoma Conference's entire catalog, covering 1961-2003. Over the course of roughly two years, a third party constructed an electronic dataset using a combination of optical character recognition software and hand checking. Our audit suggests the data is of very high quality, on the order of 1:10,000 data entry errors, and the accuracy is further supported by verification that calculated totals of various items match the listed totals in the raw sources.

Table 1 presents summary statistics for our full sample, with the top panel showing data by pastor, and the bottom panel by church, combined across circuit

churches when they occur.¹² The first row indicates that in the average year, 459 unique Methodist pastors are employed in Oklahoma, with relatively mild year-to-year fluctuations; the inter-quartile range is 447 to 471.

The second and third rows show summary statistics for pastor tenure, both over his entire lifetime (row 2) and at specific churches (row 3). With the caveat that the data are both right and left-censored, we find that a pastor typically serves at a church for slightly more than 2.6 years, with fewer than five percent of pastors lasting greater than six years with a given congregation. This implies that the typical pastor is rotated at an annual rate of about $1/2.67 = 37$ percent, which slows down a bit as a pastors gain experience. We also define a variable, *Time_in_Sample*, which captures the number of years since a pastor first appeared in the conference's records. A typical pastor appears in our dataset for 9 years.

In the fourth row, we show the total number of lifetime church assignments for a pastor. These rotations will play a crucial role in our analysis, as they allow us to separately identify pastor effects and church effects in explaining church performance. Although the table indicates that a typical pastor serves at slightly more than three churches, roughly one quarter of pastors are assigned to five churches or more over the course of their careers.

The next set of rows summarizes the flow of pastors in and out of the Oklahoma Methodist Conference. In a typical year, roughly 42 pastors exit the system, almost identical to the number of pastors that enter (40). To put the entry and exit rates in perspective, compared to the total number of pastors (459), about nine percent of

¹² There are two holes in the data provided to us by the Oklahoma Conference. First, no data on attendance are available for 1963-64; further, no data are available for the Stillwater District for 1982 and 1990.

churches or church circuits will inherit a rookie pastor, i.e., one with no previous experience as a head pastor. A similar number will lose their pastors to exit from the Oklahoma Conference; finally, as indicated by the large fraction of pastors with low overall tenure, many pastors are likely switching professions rather than retiring outright.

In the second panel of Table 1, we summarize several church-level performance metrics. One primary measure of a church's health is the average number of people that attend Sunday morning worship services at church c in year t , $Avg_Attendance_{ct}$. Across all churches and years, the mean of $Avg_Attendance$ is 145, although this is somewhat skewed by a few large churches, e.g., St. Luke's in Oklahoma City, with average attendance of 3,559 in 1962. However, with an inter-quartile range of 58 to 152, it is clear that the typical observation in our sample is a local, neighborhood church.

Most of our analysis focuses on the annual change in attendance at each church c , $Attendance_Growth_{c,t} = \log(Avg_Attendance_{c,t}) - \log(Avg_Attendance_{c,t-1})$. As the second row of Table 1 shows, average attendance growth is negative over our sample, although only slightly. Because we are focused on attendance growth attributable to individual pastors, it is important to control for exogenous determinants of church performance, such as fluctuations in local population. The third row standardizes each church's attendance growth by county-level population growth using data from the U.S. Census (<http://www.census.gov/popest/estimates.php>). This proxy for religious demand is imperfect, in part, because most churches draw parishioners from across county lines. Although population growth in the typical Oklahoma county appears to have slightly outstripped church attendance growth over our sample, this adjustment is minor, reducing the normalized average attendance growth to -1.90 percent.

In the next few columns, we provide summary statistics on some additional variables that we will use as alternative pastor performance measures in robustness checks: log changes in church membership, $Membership_Growth = \Delta \log(Membership_{c,t})$; $\log(1+Baptisms_{c,t})$; $Revenue_Growth = \Delta \log(Revenue_{c,t})$. We note that the last of these, $Revenue_Growth$, cannot be calculated directly since revenue figures are not reported directly by each church to the conference. However, we are able to calculate a rough estimate of donations by comparing each church's expenses, which are reported, and changes in assets, which are also reported, albeit imperfectly).¹³ Finally, we use $\log(1 + Deaths_{c,t})$ in a placebo test, because it is the component of attendance growth that is most plausibly beyond the pastor's control.

IV. Pastor quality and church performance

We begin by analyzing the extent to which pastors explain the variation in performance across churches and over time, and then proceed in Section V to assess empirically how pastor performance affects pastor career trajectories through rotation and exit.

a. Variance decomposition

Our first exercise is a simple variance decomposition of attendance growth. We calculate

$$\sum_{c=1}^N \sum_{s_c=\underline{S}_c}^{\overline{S}_c-1} \left(Attendance_Growth_{c, s_c+1} - \overline{Attendance_Growth}_{c, s_c+1} \right)^2$$

¹³ See Hartzell, Parsons, and Yermack (2010) for more discussion about inferring church revenue in this context.

where we index each of our N individual churches with c . Because not every church spans the full sample period 1961 - 2003, we use a church-specific time index in the second summation, s_c , which starts when we first observe church c , $\underline{S}_c \geq 1961$, and ends when we last observe it, $\overline{S}_c \leq 2003$. $\overline{Attendance_Growth}_{c, s_c+1}$ is therefore simply the sample mean over all 17,289 church-year observations in our dataset. The sum of squared deviations may then be decomposed straightforwardly into the contributions from subsamples of pastor-year observations.

Table 2 shows the results when we split the years into two groups – those where we observe a pastor change, and those where we do not. The first column indicates that about 28 percent of church-year observations are associated with a pastor rotation. The second column lists the fraction of overall variance accounted for by each group: 38 percent for observations with pastor changes, and 62 percent for observations without. Together, these estimates imply that the volatility in attendance growth is about $(38/62)*(72/28) - 1 = 58$ percent higher in pastor-change years, compared to those where the pastor has not changed. Tests for heteroskedasticity – such as the Bartlett test, the Brown and Forsythe test, and the Levene test – all reject the null of equality of variances between the change and no-change years with p-values less than 0.0001.

The fraction of variance explained by pastor-change years is similar if we look at a decomposition of *within-church* sum of squared deviations (i.e., where each church is given its own mean for attendance growth), as illustrated by the numbers listed in the second set of columns in Table 2. Examining county population-adjusted attendance growth yields a near-identical decomposition as well.

b. Persistence of pastor performance

The variance decomposition in the prior section implies a set of discontinuous changes in attendance around pastor transitions, but does not necessarily imply a pastor effect on performance more broadly. It may simply be that transitions of any kind cause more noise in attendance measurement, or are perhaps disruptive to the congregation. It also does not indicate whether some pastors have a consistently positive (or negative) impact on attendance, as would be the case if pastor skill or ability were the explanation. Moreover, the comparison of variance from a pastor's first year versus subsequent years implies a model where a disproportionate fraction of pastor ability manifests early on, while some pastors may build their congregations over time.

We thus examine whether a pastor's performance – as measured by attendance change – is correlated across his consecutive church postings. We start with a non-parametric approach. It is necessary to define some additional notation. Individual pastors are indexed with i , with pastor i 's successive church assignments indexed as $a_i=1, 2, 3, \dots, A_i$. Within each of these assignments, we define a pastor-church specific time index, $k_{a_i} = 1, 2, 3, \dots, K_{a_i}$ that resets every time pastor i begins a new assignment, a_i . For example, $k_{3_i} = 2$ would refer to the second year of pastor i 's third church assignment.

This additional notation helps to clarify the comparisons presented in Table 3. The first panel considers only church-year observations where $k=1$, corresponding to the first years of each unique pastor-church assignment, a_i . For this set of first-year observations, we use *Attendance_Growth* as our performance metric, dividing observations into performance and then form quartiles of performance. Table 3 provides a “transition matrix,” where the horizontal axis shows the distribution of pastor i 's first-year performance in assignment a_i as a function of pastor i 's first-year performance in

the immediately preceding assignment, $a_i - 1$. Intuitively, if a pastor's first-year performance in his last church was exceptional, persistent skill would imply, on average, a similarly positive first-year performance in successive placements.

Most strikingly, the diagonal terms are uniformly higher than the off-diagonals, with values monotonically decreasing in their distance from the diagonal. Thus, pastors that generate high attendance growth in one placement are, all else equal, more likely to generate high attendance growth in their next assignment; low performance is similarly correlated across church assignments.

In Panel B we rank performance using *all* years in each of pastor i 's assignments, a_i , thus ranking pastors based on average growth rates over the spans of entire church assignments, not just their first years. This generates qualitatively similar, though slightly stronger, patterns of performance persistence across assignments.

As a more formal test of persistence, we also employ regression models similar to those used in the teacher value-added (e.g., Rockoff (2004)) and personnel economics (e.g., Lazear, Shaw, and Stanton (2011)) literatures. We start with a standard fixed effects model to examine the incremental impact of pastor fixed effects on adjusted R^2 . These results are reported in Table 4.

We begin by regressing attendance growth on county-level population growth in Column 1. As expected, there is a positive correlation between the two, significant at the 1 percent level: growing communities have an increasing population base to draw upon for church attendance. However, we note that the elasticity is far less than one, likely in part because of the relatively high level of aggregation in our population data.

Column 2 adds year fixed effects, resulting in a modest increment in adjusted R^2 to 0.006, suggesting that after controlling for county population, statewide common shocks are relatively unimportant.¹⁴ Column 3 adds church fixed effects, which generates a further small increment in adjusted R^2 to 0.019. This pattern echoes the findings from our variance decomposition in Table 2: most of the variation in attendance growth is within, not across, churches.

Column 4 shows the main result. When we add pastor fixed effects to a regression of *Attendance_Growth*, the adjusted R^2 increases to 0.125. Thus, while individual churches explain relatively little of the sample variation, as a group, pastors are collectively important determinants of attendance growth. While significant caution is in order in comparing our findings to those derived from vastly different institutional contexts with different data constraints, we may benchmark the role of pastors against those from the more secular settings. We find the incremental explanatory power of pastors is much higher than that of CEOs (Bertrand and Schoar, 2003), and comparable to that of supervisors at a technology services firm (Lazear, Shaw, and Stanton, 2011).

We now examine whether the role of pastor performance differs by church size, a relationship that is ambiguous given the range of pastor tasks and their differing degrees of scalability – “non-rival” jobs like sermonizing are scale invariant, while counseling and other ‘high touch’ activities will not scale. If the pastor is first and foremost a church manager, his talents may face diminishing returns in parish size, in the tradition of Simon (1971); other administrative tasks like management of finances are somewhat

¹⁴ In unreported results, we also find that the attendance growth of one church in a district is uncorrelated with the attendance growth of other churches in the district after controlling for zip-code level population growth. This suggests there is little evidence of district-wide common shocks to religiosity after controlling for population dynamics.

independent of scale. To the extent that ability does scale, we may predict that an attendance-maximizing church will promote high-performing pastors to larger parishes, a point we return to below.

In the final two pairs of columns in Panel A of Table 4, we investigate this scalability, quantifying the marginal explanatory power conferred by the introduction of pastor fixed effects for small and large churches separately. For small churches, the inclusion of pastor fixed effects almost quadruples the R^2 from nine percent (column 5) to 35 percent (column 6). As a percentage improvement, this is twice what we observe for big churches (17 percent to 35 percent), although the main difference is simply that church fixed effects appear more important for large churches. In both cases, models that account for pastor quality allow us to ultimately explain over one-third of the total variation in church growth, a substantial improvement over existing models based mostly on parishioner demographics (see, for example, Iannacone (1998) for results and discussion).

As emphasized by the teacher value-added literature, the estimated fixed effects in OLS regressions such as those shown in Panel A of Table 4 will overstate the true dispersion in performance among pastors, because the fixed effects themselves are measured with noise. We thus provide estimates based on the empirical Bayes method (Morris (1983)) that has become standard in the teacher performance literature.¹⁵ Intuitively, the empirical Bayes approach shrinks estimated fixed effects to account for the noise in each pastor's measured performance. For example, a pastor who consistently had above average attendance growth at every church in his career would

¹⁵ For recent examples, see Raudenbush and Bryk (2002), Rockoff (2004), Gordon, Kane, and Staiger (2006), and Kane, Rockoff and Staiger (2008).

have little shrinkage. By contrast, a pastor who had a similar average effect on attendance growth, but with high year-to-year and church-to-church variability, would have his fixed effect reduced to reflect uncertainty over whether the positive effect could truly be attributed to the pastor. In practice, the model is implemented using a mixed multilevel model with church fixed effects and pastor random effects.

In Panel B of Table 4, we present the percentile distribution of our empirical Bayes estimates, with the estimated random effects derived using the best linear unbiased predictors (Goldberger (1962), Morris (1983)). To ensure that the random effects model is well behaved, we limit the sample to churches with at least 20 years of data, although we note that the patterns reported here are not sensitive to the precise choice of cutoff.

For the entire church sample (row 1), the interquartile range of the empirical Bayes estimates is approximately 2.7 percent (-1.4 percent to 1.3 percent), or roughly 15 percent of the sample standard deviation of *Attendance_Growth*. Another way to appreciate the magnitude is to compare it to the effect of local population growth on attendance changes. Taking either of the first two columns in Panel A of Table 4 as a guide, a 10 percent increase in *County Population Growth* translates to an increase of approximately $0.1 * 0.28 = 2.8$ percent in *Attendance_Growth*, similar to replacing a pastor in the bottom quartile with one from the top quartile. Again, with a caveat on the difficulties in making comparisons across institutional domains, this is similar (though slightly lower) in magnitude to the importance of teachers in explaining student test score outcomes based on findings in the teacher value-added literature, as reviewed in Chetty et al. (2012).

In the next two rows, we present the same quantities, allowing for two separate random effects for each pastor, one each for large and small churches. The data suggest that the pastor's role does indeed scale with congregation size – the interquartile range of pastor effect estimates for small and large churches are very similar, both about 3 percent. We note, furthermore, that there is some evidence that pastor talent in small churches carries over to larger ones – the correlation between the estimates of pastors' individual effects for large versus small churches is 0.102 (p-value=0.017).

c. Measuring pastor skill with quasi-random church assignments

The results thus far do not confront concerns of endogeneity of pastor assignment, which introduces two main problems. First, to the extent that certain pastors are consistently assigned to churches primed for growth (or contraction), the apparent persistence observed in Tables 3 and 4 may reflect unobserved commonalities across pastor placements. Second, pastors may have causal impacts on church attendance that depend on complementarities, or match effects, between pastors and churches. As discussed in Bertrand and Schoar (2003), the presence of match effects makes it difficult to infer productivity changes attributable *only* to specific individuals.

However, according to senior conference administrators, initial assignments are largely random for two intuitive reasons. First, new pastors are usually fresh seminary graduates about whom the conference has limited information, certainly insofar as it pertains to a pastor's day-to-day duties. Second, new pastors can only be assigned when churches have an opening, and these often occur for exogenous reasons such as an elder pastor retiring. Thus, although the conference may still attempt to match rookie pastors

and churches, when compared to placements later in his career these are much less likely to be influenced by unobservable determinants of church growth.

We therefore take a pastor’s performance at his first church as a plausibly exogenous indication of his ability, and assess whether this estimated ability predicts performance at subsequent placements. We restrict attention to pastors who appear in the data after our sample begins in 1961, to focus on pastors where we observe performance at his first church assignment.¹⁶ We first run the following regression:

$$Attendance_Growth_{c,t} = \beta \cdot Controls_{c,t} + \varepsilon_{c,t} \quad (1)$$

for all churches, c , and years, t .¹⁷ *Control* variables include church fixed effects, year fixed effects, and *County_Population_Growth*. We then calculate a vector of pastor-specific performance residuals, calculated *only* for the set of pastors for whom we observe their first assignments. Following the notation developed previously, our pastor ability measure is thus given by:

$$\hat{\gamma}_i = \sum_{k_i=1}^{K_i} \varepsilon_{c, k_i}, \quad \forall i$$

where the time index, k , applies only to the years in each pastor i ’s first assignment, i.e., where $a_i=1$. For example, suppose that a pastor’s initial church placement was in 1975, where he remained for 3 years. This pastor’s ability measure $\hat{\gamma}$ would simply equal the sample mean of the residual from (1), calculated from 1975-1977. Repeating this calculation for every initial placement, we obtain a set of quasi-exogenous ability

¹⁶ We further screen out the four individuals with an “initial” placement in a church with greater than 500 in *Attendance* in the year of the pastor’s arrival. These cases correspond, to seasoned pastors who, at some point prior to 1961, accepted an administrative role (e.g., a district superintendent), and have since returned to their roles as individual church pastors.

¹⁷ In Equation (1), it is assumed that each church c only enters the estimation for years it exists in the sample, or following the notation developed earlier, when $\underline{S}_c \leq s_c \leq \overline{S}_c$. For ease of exposition, we thus use a common time index, t .

measures that is less vulnerable to endogenous assignment concerns. We then use the vector $\hat{\gamma}_i$ to predict performance at each pastor's *subsequent* placements,

$$Attendance_Growth_{c,t} | (a_i > 1) = \alpha \hat{\gamma}_i + \beta \cdot Controls_{c,t} + \varepsilon_{c,t}. \quad (2)$$

Note that this estimation includes only non-initial placements, i.e., where $a_i > 1$, while our estimates of pastor ability from initial placements, $\hat{\gamma}_i$, serve as our main covariate.

The results of estimating Equation (2) appear in Table 5. Column (1) indicates a strong, positive relationship between estimated first-assignment attendance growth, $\hat{\gamma}_i$, and *Attendance_Growth* in subsequent church placements, significant at the one-percent level. (Note that the reduction in sample size relative to earlier tables is due to the $a_i > 1$ restriction.) The estimated coefficient on $\hat{\gamma}_i$ implies an attendance growth elasticity of nearly five percent.

In columns (2) and (3) we divide the sample into those in the pastor's first year versus subsequent years at each church. As previously noted in the variance decomposition shown in Table 2, a disproportionate fraction of variation in attendance growth occurs in pastor transition years. If this is attributable to pastor quality, we expect pastor ability to be most predictive of performance in these years. Our estimates bear out this prediction: the coefficient on $\hat{\gamma}_i$ doubles to 0.10 for the sample restricted to transition years (column (2)), significant at the one percent level. This is more than six times larger than the comparable coefficient for the sample of non-transition years in column (3), where the coefficient on $\hat{\gamma}_i$ does not approach statistical significance.

Columns (4) and (5) shows the results when we try to reduce measurement error in $\hat{\gamma}_i$, based on the premise that ability may be measured more precisely for pastors with

longer tenures at their initial placements. Accordingly, when we include only pastors where ability $\hat{\gamma}_i$ can be estimated with more than a single year of data (i.e., for all pastor i where $K_{1_i} > 1$), the coefficient of interest increases to 0.205, double the comparable estimate in column (2). Performance in later years remains unrelated to $\hat{\gamma}_i$.

Column 6 indicates that a pastor's early experience more predictive of performance in small churches, though we note that the point estimate is significant only at the 10 percent level; a comparison of first-year performances (columns 2 and 7) goes in the same direction, though the effect is smaller in magnitude and does not approach significance. Most initial placements are, of course, at small churches, so the fact that our ability measure provides only weak predictive power of performance at larger churches could result from the different skills required for churches of different sizes. However, given the noisiness of these estimates, any such conclusion needs to be made with caution.

We conclude this section with some robustness and falsification exercises. In the first column of Table 6, we present a placebo test based on $\log(1 + Deaths)$ as a 'performance' metric. This is the dimension of church attendance growth that is most plausibly beyond the pastor's control. The results in Column (1) indicate that deaths at a pastor's first placement have no predictive power for deaths at subsequent churches – the coefficient on $\log(1 + Deaths)$ is 0.017, with a standard error of nearly 0.019. In the remaining columns, we present analogous results for various alternative performance measures, including *Baptisms*, *Membership_Growth*, and *Revenue_Growth*. We find a significant level of persistence across all performance measures – albeit of varying magnitudes – aside from revenue growth. The likely explanation for the lack of impact

on revenues is that our proxy for church-level revenues is relatively noisy, as discussed in Section III.

V. Flow of human capital in the church

If individual pastor quality has a significant impact on church attendance, it is natural to investigate the *flow* of pastoral human capital, both across churches and out of the conference entirely. Whereas the decision to quit largely reflects individual tradeoffs, the conference is responsible for allocating pastors across churches, allowing us to infer the objectives of the conference generally.

a. Pastor exit

In Panel A of Table 7, we present the percent of pastors that exit the sample in year t , as a function of each quartile of the *Attendance_Growth* distribution in year $t-1$. In the first column, we show the results for the full sample. The bottom performance quartile indicates an exit rate of 12.5 percent, over 4 percentage points higher than the third quartile, which in turn is higher than the exit rate in the second quartile. Exit rates appear similar among pastors in the top half of the performance distribution.

In Columns (2) and (3) we show the sample split by whether the pastor is a church elder, which affords considerable job security. The pastor elder observations (column 2) are associated with much lower exit rates across all quartiles. However, it is noteworthy that the performance gradient exists in both subsamples, suggesting that there is an important role for self-selected exit by low-performing pastors. In column (4) we show the probability of exit from a pastor's first church, and in (5) all subsequent

churches. Note that in these columns we limit the sample to those pastors that enter the conference on or after 1961, so we can credibly identify their first churches. The exit rate is much higher during initial placements, where up to one fifth of the poorest performers quit, though once again the performance gradient is similar for both subsamples.

We formalize these univariate patterns in a multivariate regression in Table 8, based on a Cox proportional hazard model, stratified by church. In column (1), we predict a pastor's exit in year t as a function of his *Attendance_Growth* in year $t-1$. The reported hazard ratio is not significantly different from one at conventional levels (p-value=0.13), and its value, 0.72, implies that an increase in one-year lagged *Attendance_Growth* of 0.56 – the within-church average standard deviation – would increase the probability of exit by about 1.5 percent.

However, as Table 7 already indicated, the relation between past performance and exit is highly non-linear. Column (2) thus also shows the result of a hazard specification with a discrete indicator for performance, *High Growth*, which denotes whether *Attendance_Growth* in year $t-1$ is above the median, when measured across all churches that year. The effect of *High_Growth* is very large in magnitude, implying a 27 percent reduction in the probability of exit relative to the baseline hazard rate, and is significantly different from unity at the one percent level. When we include both *Attendance_Growth* and *High_Growth* together in Column (3), the coefficient on *High_Growth* is almost unchanged, while the coefficient on *Attendance_Growth* becomes positive though not significantly different from one. (Adding *Elder* as a

covariate to control for job security does not affect any of the coefficients on attendance measures, though *Elder* itself enters very significantly.)

We now turn to examine how opportunities in the external labor market affect exit decisions, using oil price to capture economic prospects from employment in secular professions. Oklahoma is home to some of the largest private oil interests in the U.S. The energy sector contributes between 10 and 20 percent of state GDP – an estimate that fluctuates with the price of oil – and thus serves as a plausible external shock to wealth and opportunity in the state. (See, for example, Wolfers (2012) for a discussion of oil price as instrument for state-level economic shocks.) The simple pairwise correlation between pastor exit rates and oil prices is over .3, a relation that is illustrated in the time-series plots in Figure 1. The years 1980 and 2000 are particularly notable, when oil prices spiked sharply, coincident with similarly steep increases in pastoral exit rates.

Column (4) of Table 8 adds the price of oil as a predictor of a pastor's exit probability. The point estimate of 0.011 indicates a one percent increase in a pastor's exit probability for every dollar increase in oil prices. Put differently, a one standard deviation change in the price of oil (\$10.63), increases the probability that a pastor exits the Oklahoma Conference by eleven percent.

Next, we consider pastor rotations across churches within the Oklahoma Conference. The church may choose to give underperforming pastors a fresh start at a new parish, and any performance-rotation relationship may be reinforced by the fact that the pastor-parish relations committee at each church may request a new pastor if unsatisfied with the current match. Empirically, we begin by showing rotation rates by

Attendance_Growth quartiles in the bottom panel of Table 7, to facilitate a comparison to the exit rate patterns shown in the top panel. The comparison suggests an even stronger relation between performance and rotation, relative to the relationship between performance and exit. Moreover, the performance-rotation relationship appears monotonic across quartiles – high-performing pastors are less likely to rotate than intermediate quality ones. The patterns are quite similar across the sample splits shown in columns (2) – (5).

As with exit, we apply a hazard model to the rotation decision in the final columns of Table 8, using the same set of covariates as in the first set of columns. The continuous measure of *Attendance_Growth* is a strong predictor of pastor rotation (column (5)), significantly different from unity at one percent. However, we find, as with exit, that rotation decisions are primarily sensitive to above average growth: the coefficient on the *High_Growth* dummy is significantly different from one in Column (6), and when both the linear and discrete growth measures are included in Column (7), the coefficient on *High_Growth* is unchanged, while the coefficient on *Attendance_Growth* becomes indistinguishable from one. In contrast to the results on exit, we find no effect of oil price on rotation decisions.

Our results on rotation suggest that the church leaves well-functioning pastor-church matches intact. But given that pastor effects are correlated across church size, and that the importance of pastors appears to some degree scale-invariant, the conference may also choose to promote high-performing pastors to larger congregations where their abilities may be applied over a larger constituency. To the extent that

pastors value the prestige and prerequisites that come with larger congregations, this has the added benefit of motivating pastors to grow attendance and membership.

Table 9 examines this issue directly, linking the performance at a pastor's previous church to the size of the church he is currently assigned. We first average *Attendance_Growth* over all of the years for each pastor-church assignment a_i , allowing us to make comparisons between shorter and longer assignments. Then, we explain the size of a pastor's church a_i as a function of the average growth rate at assignment a_{i-1} . To give a specific example, we would relate the size (*Avg_Attendance*) of a pastor's fourth church to his average per-year *Attendance_Growth* in his third church (denoted as *Last Church Performance*). To avoid conflating the effects of a pastor's arrival on the size of his next church, we measure church size using the average from the prior year.

The first column shows a strong relationship between a pastor's performance at his last church, and the size of his current assignment. We add fixed effects for pastor church placement number (a_i) and control for the logarithm of the time a pastor has appeared in the sample in columns (2) and (3) respectively, because a pastor is likely to be assigned to larger churches over time. The coefficient on lagged performance increases slightly in magnitude. (Given the relatively small number of observations for each church, if we include church fixed-effects, this saturates the model – the R^2 increases to nearly 0.9, and no variable is statistically significant.) The results suggest a significant role for past performance in predicting congregation size on next placement. The coefficient on lagged average attendance growth in Column (1), with just year effects, is 0.26, significant at the five percent level. Given the standard deviation of lagged average performance of 0.14, this implies that a one standard deviation increase

in prior performance increases the attendance at a pastor's next placement by about 3.6 percent.

In addition to improving pastor quality by strategic rotation and the attrition of lower-performing ones, the church may boost the performance of a given pastor through training or better-quality pastor-church matches over time. We examine this possibility by looking at how performance changes across churches, and over a pastor's time in the conference. Specifically, Table 10 shows the results of a regression of *Attendance_Growth* on the logarithm of a_i , which we label as *Church_Number* in the table, and the logarithm of k_{a_i} (*Years_at_Church*). The first captures the effect of a pastor's *general* experience through his successive church placements; the second measures the effect of a pastor's *church-specific* experience. However, as Table 10 shows, in no case is either coefficient significant at conventional levels. These results are consistent with good pastors being "born not made."

VI. Conclusion

Our analysis of the Methodist church in Oklahoma reveals that the human capital of pastors are an important determinant of church attendance: replacing a 25th percentile pastor with one at the 75th percentile pastor increases annual attendance growth by three percent, similar to the effect of a ten percent increase in the surrounding county's population. We argue that the persistent influence of pastors on attendance growth is causal, given the predictive power of a pastor's performance in his first church on performance in future congregations.

The movement of pastors within the Oklahoma ministry is broadly consistent with the conference efficiently allocating labor resources across churches: pastor performance increases across churches (but not across years within a church), and low-performing pastors are much more likely to be rotated, consistent with a model of pastor-church matching. Additionally, high-performing pastors are moved to larger congregations, and that low-performing pastors are more likely to exit the sample.

Our findings emphasize the importance of considering both the production and consumption side in studying religion. For example, given the critical role of human capital in religious production and sensitivity of pastor exit to economic booms, one must be careful in attributing the effects of income shocks solely to demand side considerations – as with other markets, analysis of religious attendance needs to consider the simultaneous effects of shifts in both supply and demand.

Our inside-the-organization analysis of religious participation also provides micro-foundations for understanding the organization of religious enterprise more broadly. This can help to inform analysis of the organization of churches within a religion, and even competition amongst religion, which may be an important input itself into overall participation rates (see, e.g., Finke and Starke (1988), Zaleski and Zech (1995)).

We focus in this study on the Methodist church, where pastor allocation decisions are made centrally. One direction for further research may be to compare human resource decisions across denominations, comparing the effectiveness of decentralized approaches (e.g., Baptists and Presbyterians) to their centrally organized analogs (e.g., Methodists and Catholics). Such cross-denominational comparisons may thus help to

assess whether, in the production of religion, organizational forms contribute to differences in performance. We leave this and similar questions to future work.

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Figure 1: Pastor Exit and Oil Prices

The figure plots crude oil prices in 2008 dollars and the number pastors who leave the United Methodist Church in the state of Oklahoma between 1974 and 2002. Oil prices are from BP Statistical Review of World Energy, June 2010, BP p.l.c., London, UK. Pastor exits in a given year are the number of pastors who were in the dataset in current year but not in the following year.

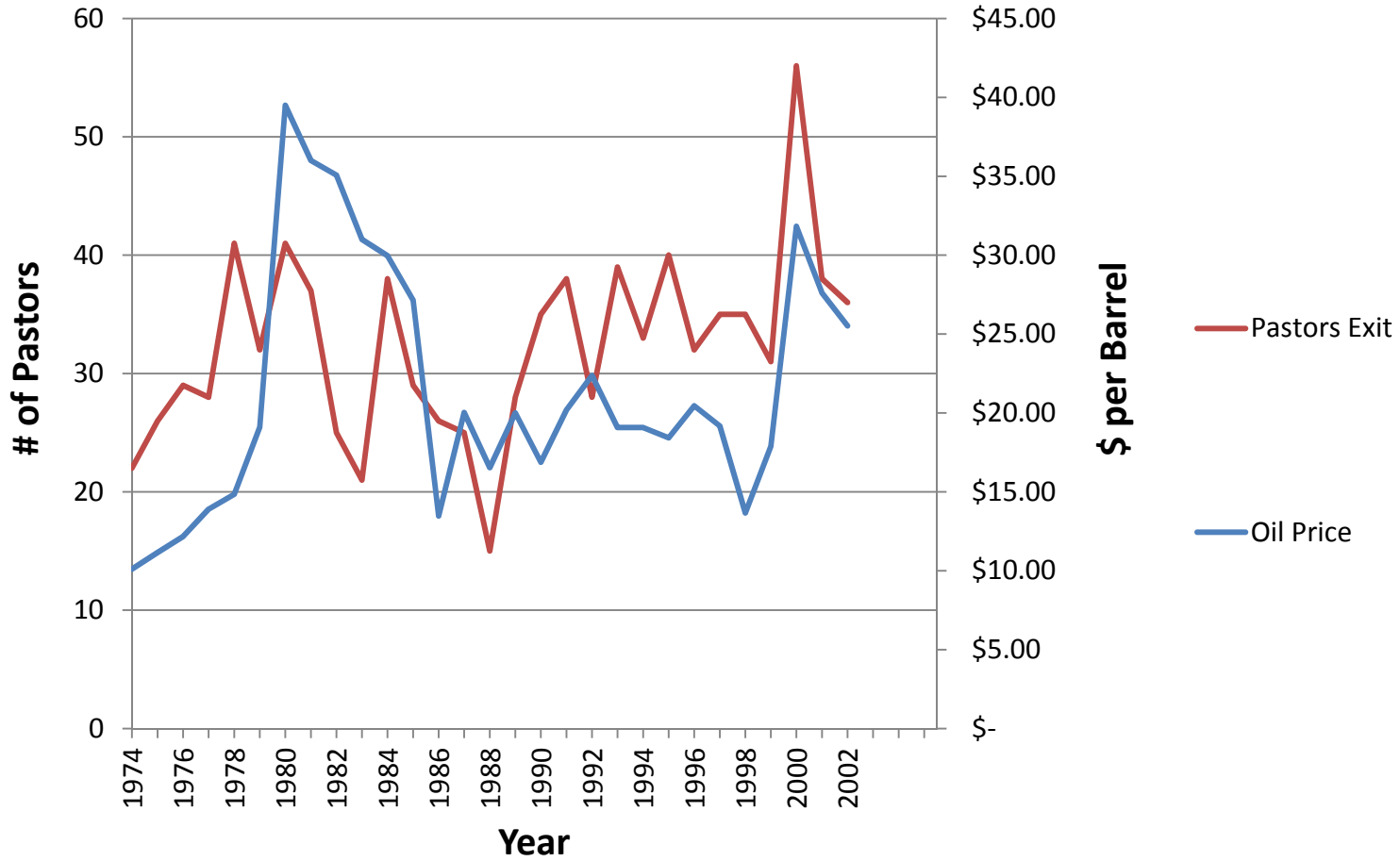


Table 1: Summary Statistics

In the first panel, data by pastor is summarized. Unique Pastors in a Given Year is a yearly observation equal to the number of unique pastors we observe in the dataset in a given year. Pastor Tenure (Lifetime) is the number of years we observe the pastor in the dataset, given he begins after 1961 and before 1990. Pastor Tenure at Individual Church is the number of years a pastor works at an individual church, given he begins after 1961 and before 1990. Churches Worked by Pastor is the number of churches worked by a pastor who began working after 1961 but before 1990. Pastors Added in a Year is a yearly observation equal to the number of unique pastors we observe in the current year who did not work the previous year. Pastors Dropped out in a Year is a yearly observation equal to the number of unique pastors we observe in the previous year who are not working in the current year. The sample period for our dataset is from 1961 to 2003.

In the second panel, church-level performance metrics are summarized. Metrics are calculated for church c in year t . Average attendance is the average number of people that attend Sunday morning worship services at a church, for each year. Attendance growth is calculated as the difference between the logarithm of the average attendance for a church in the current year and the logarithm of the average attendance for the same church in the previous year ($\Delta \log(Avg_Attendance_{c,t})$). The third row standardizes each church's attendance growth by county-level population growth using data from the US Census. Membership growth is the change in the logarithm of membership between that of the current year and that of the previous year ($\Delta \log(Membership_{c,t})$). Baptisms is calculated as $\log(1+Baptisms_{c,t})$. Revenue growth is the change in the logarithm of estimated revenues for church c in year t , $\Delta \log(Revenue_{c,t})$. Deaths is calculated as $\log(1 + Deaths_{c,t})$.

PASTORS

	Mean	St. Dev.	5th	25th	Median	75th	95 th
Unique Pastors in a Given Year	458.93	18	430	447	460	471	492
Pastor Tenure (Lifetime)	8.77	8.66	1	2	5	14	26
Pastor Tenure at Individual Church	2.64	2.31	1	1	2	3	6
Churches Worked by Pastor (Lifetime)	3.28	2.83	1	1	2	5	10
Pastors Added in a Year	40.21	10.96	25	32	38	47	58
Pastors Dropped out in a Year	40.97	6.89	31	36	40	47	53

CHURCHES

	Mean	St. Dev.	5th	25th	Median	75th	95 th
Average Attendance	145.00	207	25	58	92	152	405
Attendance Growth	-1.30%	19%	-26%	-8%	0%	6%	22%
Population-Adjusted Attendance Growth	-1.90%	19%	-27%	-9%	-1%	5%	22%
Membership Growth	-0.20%	11%	-11%	-2%	0%	2%	8%

Baptisms (log)	1.58	1.08	0.00	0.69	1.61	2.30	3.33
Revenue Growth	-1.0%	52%	-67.9%	-16.5%	-0.8%	15.7%	64.6%
Deaths (log)	1.44	0.91	0.00	0.69	1.39	2.08	2.94

Table 2: Pastor Changes and Attendance Growth

The two tables perform a variance decomposition for yearly church attendance changes. Attendance changes are defined as the difference in log attendance for consecutive years (Unadjusted) and the difference in log attendance for consecutive years minus the difference in log population for the zip-code matched area (Population Adjusted). The top panel, calculates the global mean (the average attendance change across all churches in all years) and then calculates a squared deviation from this global mean for each observation. The sum of squared errors (SSE) is calculated for years in which there was a pastor change and for years in which there was no pastor change. The bottom panel, calculates a church-specific mean (the average attendance change for a given church over its years) and then calculates a squared deviation from this church-specific mean for each observation. The sum of squared errors (SSE) is calculated for years in which there was a pastor change and for years in which there was no pastor change.

Variance Decomposition of Attendance Growth

		Population Adjusted	Unadjusted
	# of Obs (%)	SSE (%)	SSE (%)
Years with a Pastor Change	4,789 (28%)	225.72 (38%)	227.96 (38%)
Years without a Pastor Change	12,500 (72%)	373.74 (62%)	376.17 (62%)
TOTAL	17,289 (100%)	599.46 (100%)	604.13 (100%)

Variance Decomposition of Within-Church Attendance Growth

		Population Adjusted	Unadjusted
	# of Obs (%)	SSE (%)	SSE (%)
Years with a Pastor Change	4,789 (28%)	211.505 (38%)	214.10 (38%)
Years without a Pastor Change	12,500 (72%)	341.079 (62%)	344.95 (62%)
TOTAL	17,289 (100%)	552.58 (100%)	559.05 (100%)

Table 3: Pastor Talent and Persistence

The two tables consider the distribution of attendance growth for pastor i at church assignment a_i given as a function of pastor i 's attendance growth at the immediately preceding church assignment, $a_i - 1$. The top panel considers attendance growth only for the first years of each assignment. The bottom panel considers the average growth in attendance over all years of a pastor's assignment. The distribution of attendance growth is broken into quartiles with 1 (4) representing the lowest (highest) quartile.

First-Year Attendance Growth

Population-Adjusted					Unadjusted				
Church _{i-1} \ Church _i	1	2	3	4	Church _{i-1} \ Church _i	1	2	3	4
1 = Lowest	29%	29%	25%	17%	1 = Lowest	28%	31%	24%	17%
2	24%	29%	28%	20%	2	21%	32%	29%	18%
3	19%	28%	30%	23%	3	20%	28%	27%	25%
4 = Highest	15%	25%	26%	33%	4 = Highest	17%	24%	27%	32%

Average Attendance Growth

Population-Adjusted					Unadjusted				
Church _{i-1} \ Church _i	1	2	3	4	Church _{i-1} \ Church _i	1	2	3	4
1 = Lowest	33%	28%	23%	16%	1 = Lowest	34%	28%	23%	15%
2	23%	32%	27%	18%	2	23%	33%	26%	18%
3	20%	24%	33%	23%	3	21%	23%	33%	23%
4 = Highest	16%	26%	28%	29%	4 = Highest	16%	25%	29%	30%

Table 4: Individual Pastors and Determinants of Attendance Growth

Panel A of this table reports the results from eight regressions where the dependent variable is attendance growth. Attendance growth is defined as the difference in log attendance for consecutive years at a church, $\Delta \log(Avg_Attendance_{c,t})$ for church c in year t . Local population growth is the difference in log population for the matched county. The first column reports the results when attendance growth is regressed on local population growth. Year fixed effects are added in column 2; church fixed effects are added in column 3, and pastor fixed effects are added in column 4. Columns 5 and 6 (7 and 8) consider the empirical Bayes specification among small (large) churches. Robust standard errors are in parentheses. *, **, and *** represent significance at the 10%, 5% and 1% levels, respectively.

Panel B of this table reports the percentile distribution of the empirical Bayes estimates, with the estimated random effects derived using the best linear unbiased predictors. The sample is limited to churches with at least 20 years of data. The first row reports the results for the entire sample, while the second and third rows report results for small and large churches, respectively.

Dependent Variable: Church Attendance Growth								
					Small Churches		Large Churches	
County Population Growth	0.280*** (0.0556)	0.283*** (0.0652)	0.107 (0.0775)	0.0965 (0.0788)	0.117 (0.149)	0.0946 (0.168)	0.0716 (0.0967)	0.0254 (0.100)
Year Fixed Effects	NO	YES	YES	YES	YES	YES	YES	YES
Church Fixed Effects	NO	NO	YES	YES	YES	YES	YES	YES
Pastor Fixed Effects	NO	NO	NO	YES	NO	YES	NO	YES
Observations	15,357	15,357	15,357	15,357	4,770	4,770	6,973	6,973
Adjusted R ²	0.002	0.015	0.102	0.260	0.093	0.349	0.167	0.348

Percentiles of Empirical Bayes Coefficients

	1st	5th	10th	25th	50th	75th	90th	95th	99th
All Churches	-5.5%	-3.6%	-2.5%	-1.4%	0.0%	1.3%	2.6%	3.6%	5.1%
Small Churches	-7.9%	-5.5%	-4.2%	-2.3%	-0.5%	1.0%	2.8%	4.0%	6.0%
Large Churches	-5.0%	-3.1%	-2.1%	-0.9%	0.6%	2.1%	3.7%	5.2%	6.1%

Table 5: Initial Placement and Future Performance

The table reports the results from seven regressions where the dependent variable is residual church attendance growth:

$$Attendance_Growth_{c,t} | (a_i > 1) = \alpha \hat{\gamma}_i + \beta \cdot Controls_{c,t} + \varepsilon_{c,t}$$

Residual church attendance growth is defined to be attendance growth in all church assignments (in church c and year t) subsequent to the first placement, i.e., where $a_i > 1$. ($a_i = 1, 2, 3, \dots, A_i$ is the index for pastor i 's successive church assignments.) Pastor i 's performance at his first placement is used as the main regressor. It is given as:

$$\hat{\gamma}_i = \sum_{k_{1i}=1}^{K_{1i}} \varepsilon_{c, k_{1i}}, \quad \forall i$$

This is a vector of pastor-specific performance residuals, calculated only for the set of pastors for whom their first assignments are observed. Additionally, the pastor-church specific time index, k , applies only to the years in each pastor i 's first assignment, i.e., where $a_i = 1$.

The sample is restricted to pastors who entered the sample after 1961. In the first column, Residual Church Attendance Growth is regressed on First Assignment Attendance Growth. In columns (2) and (3), the sample is divided into those in the pastor's first year versus subsequent years at each church. In columns (4) and (5), the sample is limited to pastors with tenures longer than one year at their first placement. In columns (1)-(5), log of time in sample, the number of years a pastor appears in the sample, is included as a covariate. In columns (6) and (7), initial placements at large churches are considered. The dummy Large Church is added, as well as the interaction term between First Church Attendance Change and Large Church. Large Church is set to one if the church has an average attendance that is greater than the median attendance that year. Robust standard errors are in parentheses. *, **, and *** represent significance at the 10%, 5% and 1% levels, respectively.

Dependent Variable: Residual Church Attendance Growth

First Assignment Attendance Growth	0.0482*** (0.0155)	0.102*** (0.0293)	0.0137 (0.0165)	0.205*** (0.0678)	0.0376 (0.0359)	0.0631*** (0.0222)	0.116** (0.0452)
Log(Time in Sample)	-0.00837** (0.00337)	-0.0102* (0.00537)	-0.00906** (0.00424)	-0.00467 (0.00871)	-0.00772 (0.00631)	-0.0159*** (0.00357)	-0.0138*** (0.00494)
First Church Attendance Change * Large Church						-0.0538* (0.0302)	-0.0540 (0.0576)

		1 Year		> 1 Year			
Large Church						0.0339***	0.0307***
						(0.00451)	(0.00479)
Tenure		1 Year	> 1 Year	1 Year	> 1 Year		
Years at First Church				> 1 Year	> 1 Year		
Observations	4,429	1,583	2,846	953	1,834	4,429	2,787
R ²	0.016	0.040	0.020	0.056	0.021	0.032	0.036

Table 6: Other Performance Measures and Placebos

Table 6 reports the results of some robustness and falsification exercises. The sample is restricted to pastors who entered the sample after 1961. In column (1), deaths at a pastor's placements subsequent to the first one are regressed on deaths at the pastor's first placement. Deaths is calculated as the logarithm of (1+Deaths). In columns (2)-(5), other performance measures are used: baptisms, membership growth, net transfers, and revenue growth. Net transfer is equal to $\log(1+\text{transfers from other denominations}) - \log(1+\text{transfers to other denomination})$. Logarithm of time in sample, which is the number of years the pastor has appeared in the sample, is present in all regressions as a control. Robust standard errors are in parentheses. *, **, and *** represent significance at the 10%, 5% and 1% levels, respectively.

	Dependent Variable:				
	Deaths	Baptisms	Membership Growth	Net transfer	Revenue Growth
Deaths in 1st Church	0.0135 (0.0175)				
Log(Time in Sample)	0.00682 (0.0147)	0.0158 (0.0192)	0.00186 (0.00156)	-0.00229 (0.0245)	0.00927 (0.00683)
Baptisms in 1st Year		0.0673*** (0.0238)			
Membership Growth in 1st Church			0.0750*** (0.0211)		
Net transfer in 1st Church				0.0706*** (0.0233)	
Revenue Growth in 1st Church					0.000509 (0.0157)
Observations	5,217	5,217	5,213	5,217	4,272
Adjusted R ²	0.005	0.012	0.012	0.009	0.004

Table 7: Univariate Evidence of Performance, Exit and Rotations

Panel A considers the likelihood of a pastor’s exit from the United Methodist Church Oklahoma. It tabulates the likelihood of a pastor’s exit in Year t given the attendance growth of his church in Year t-1. Panel B considers the likelihood of a pastor’s rotating from one United Methodist church in Oklahoma to another. A pastor is said to have rotated churches if he is at a different church in Year t as he was in Year t-1. Pastor exits from the sample are coded as missing so as to distinguish the Panel B from Panel A. For both panels, attendance changes are defined as the difference in log attendance for consecutive years at a church. The first column of both panels considers all of the observations. The second (third) column considers the subset of observations for which the pastor is (is not) a church elder. The forth (fifth) column considers the subset of observations where the pastor is (is not) in his first church.

Probability of Exit in Year t					
Pastor Rank in Year t - 1	All Obs	Elder	Non-Elder	1 st Church	Not 1 st Church
1 = Lowest	12.5%	10.5%	16.8%	19.0%	11.0%
2	8.1%	6.4%	14.1%	15.1%	7.5%
3	7.5%	5.1%	12.6%	11.7%	6.6%
4 = Highest	7.6%	4.5%	12.9%	13.4%	6.3%

Probability of Rotation in Year t					
Pastor Rank in Year t - 1	All Obs	Elder	Non-Elder	1 st Church	Not 1 st Church
1 = Lowest	26.3%	27.7%	20.3%	19.2%	25.9%
2	25.1%	24.2%	22.3%	23.7%	23.6%
3	20.7%	19.0%	18.5%	18.4%	19.2%
4 = Highest	15.4%	14.4%	15.2%	15.4%	14.5%

Table 8: Regression Evidence of Performance, Exit and Rotations

The table considers the likelihood of pastor exit (first five columns) and rotation (last five columns) in a proportional hazard model. Pastor exit is when the pastor exits the sample; rotation is when a pastor switches churches. Independent variables are attendance growth, a dummy variable for above-median attendance growth (High Growth), oil prices, and a tenured pastor dummy. Attendance growth is calculated as the difference between the logarithm of the average attendance for a church in the current year and the logarithm of the average attendance for the same church in the previous year. A tenured pastor is one who cannot be removed or transferred except for a canonical reason, i.e., a reason laid down in the law and, in the case of a criminal charge, only after trial. Oil prices are from BP Statistical Review of World Energy, June 2010, BP p.l.c., London, UK. Robust standard errors are in parentheses. *, **, and *** represent significance at the 10%, 5% and 1% levels, respectively.

	Dependent Variable:							
	EXIT	EXIT	EXIT	EXIT	EXIT	ROTATE	ROTATE	ROTATE
Attendance Growth	0.722 (0.211)		1.407 (0.462)		0.468*** (0.0611)		0.954 (0.160)	
High Growth (dummy)		0.788*** (0.0569)	0.730*** (0.0730)	0.781*** (0.0471)		0.733*** (0.0272)	0.740*** (0.0360)	0.739*** (0.0254)
Oil Price				1.011 (0.00433)				0.992* (0.00430)
Observations	15,476	15,476	15,476	15,476	15,476	15,476	15,476	15,476
Clustering				Year				Year

Table 9: Performance and Future Church Size

Table 9 reports the regressions of church size, the average attendance of the church of the pastor's current assignment, on pastor *i*'s performance during his previous assignment. The independent variable, Last Church Performance, is attendance growth for each pastor during the final year of his most recent church assignment. In column (1), Church Size is regressed on Last Church Performance. In columns (2) and (3) fixed effects for pastor church placement number and tenure are added. In column (3), log of time in sample, the number of years a pastor is present in the sample, is added as a control. Robust standard errors are in parentheses. *, **, and *** represent significance at the 10%, 5% and 1% levels, respectively.

Dependent Variable: Church Size			
Last Church Performance	0.257** (0.117)	0.261** (0.118)	0.258** (0.117)
Log(Time in Sample)			0.555 (0.422)
Church Number FE	NO	YES	YES
Tenure FE	NO	NO	YES
Observations	3,404	3,404	3,404
R ²	0.682	0.694	0.708

Table 10: Church Number and Performance

Table 10 shows the results of regressing attendance growth on $\log(\text{Church_Number})$ and $\log(\text{Years_at_Church})$. Attendance growth is used as the dependent variable; it is calculated as the difference between the logarithm of the average attendance for a church in the current year and the logarithm of the average attendance for the same church in the previous year ($\Delta\log(\text{Avg_Attendance}_{c,t})$). $\log(\text{Church_Number})$ is the logarithm of the number of church assignments the pastor has had, including the current assignment. $\log(\text{Years_at_Church})$ is the pastor-church time index, or the number of years the pastor worked at that assignment. Robust standard errors are in parentheses. *, **, and *** represent significance at the 10%, 5% and 1% levels, respectively.

Dependent Variable: Performance			
$\log(\text{Church_Number})$	0.00593 (0.00920)		-0.00257 (0.0115)
$\log(\text{Years_at_Church})$		-0.0152* (0.00917)	-0.00587 (0.00408)
Observations	7,439	7,439	7,439
R ²	0.199	0.523	0.199