Measuring the Cost Implications of the Collaborative Accountable Care Initiative in Texas

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Accountable care organizations (ACOs) are provider-led organizations with a strong base of primary care providers who are collectively accountable for the quality and per-capita costs across the full continuum of healthcare for a population of patients.[1-4] As part of the Affordable Care Act, many provider organizations have formed ACOs that are reimbursed for the care provided to Medicare patients. Under Medicare's program, ACOs share in any savings and, in some cases, excesses, in the cost of care provided, relative to historic benchmarks.[5]

A recent report estimates that there are 782 ACOs across the country, with 54% operated by private payers.[6] Private ACOs differ greatly in form and size. They can be led by a hospital or hospital system, or include physician practices only.[7] Provider reimbursement could take the form of shared savings in a fee-for-service (FFS) environment or as limited or substantial capitation arrangements. Private insurers also differ in the performance measures used to track quality.[1] The criteria used for provider selection also differ across insurers, as does the level of technical assistance provided to participating providers (eg, disease management or health information exchange support).[8]

Several policy experts and clinicians have written about the potential advantages of ACOs for improving the quality of healthcare and controlling healthcare cost growth,[3,7,9,10] and many other papers have focused on advice for structuring or regulating ACOs.[1,11-14] There has been extensive literature—we are unable to fully acknowledge it here—examining the cost and/or quality implications of integrated care, which is one important feature of ACOs.[15-25] Meanwhile, there are fewer studies documenting the actual performance of ACOs, which include incentive payments for providers on cost or quality metrics.[26-36]

A 2012 publication reported the early results on patient costs and outcomes for Cigna's Collaborative Accountable Care (CAC) initiative for physician practices in 3 parts of the country: Arizona, New Hampshire, and Texas.[28] This initiative is a shared savings program that offers practices, in their first year of participation, an upfront care coordination fee to pay for investments in infrastructure that

ABSTRACT

OBJECTIVES: We analyzed changes in healthcare spending associated with the implementation of Cigna's Collaborative Accountable Care (CAC) initiative in a large multi-clinic physician practice.

STUDY DESIGN: We compared claims from 2009, prior to the CAC initiative, against claims for 2010 to 2011, contrasting the patients covered by Cigna's CAC initiative with patients in other practices in the same geographic area covered by Cigna's medical plan.

METHODS: We used a propensity weighted difference-in-differences approach, adjusting for age, sex, health status, and secular trends to isolate the treatment effect of the CAC.

RESULTS: The CAC initiative resulted in a 5.7% reduction in net spending per patient for 2010 to 2011, relative to what spending would have been without the initiative. This reduced spending was evident in multiple service categories: evaluation and management, procedures, imaging, tests, and durable medical equipment. Professional payments, inpatient facility, and outpatient facility payments for Medical Clinic of North Texas enrollees all experienced significant cost savings relative to the control group. About half of the savings resulted from using lower-priced sources.

CONCLUSIONS: The CAC initiative, which includes an embedded care coordinator and a list of recommended providers, was associated with cost savings similar to those reported by other initiatives, such as global budgets and risk-based contracts.

furthers progress toward quality and cost targets. Cigna provided substantial support in informatics, care coordination, and consultation to aid participating practices. After the first year of intervention, Cigna analyzed medical claims and found no significant decrease in medical costs compared with expected costs for 2010. Other than this paper, we are aware of only 5 other studies of the cost effects of private ACO programs that have included a control group in their performance assessment.[26,27,34-36] All of these studies examined the cost and/or quality impact of the Blue Cross Blue Shield (BCBS) Alternative Quality Contract in Massachusetts; the combined results suggest that the program lowered spending and improved quality overall, although effects differed for specific patient populations and conditions.

In this study, we report more detailed results after 2 years of CAC implementation for the physician practice in Texas (Medical Clinic of North Texas, P.A.). Using longer-term data, we compare the cost trends for physicians participating in Cigna's initiative, relative to physicians in the surrounding market. We also compare the trends in costs by type of service and site of care in order to assess whether these trend differences were consistent with the financial incentives introduced by Cigna. It is beyond the scope of this current analysis to examine changes in the quality of care after CAC implementation; however, the physician practice received a payout from the initiative, implying that the quality criteria in the contract were met and quality did not deteriorate as a result of the initiative.

Program Features

The CAC arrangement with the Medical Clinic of North Texas, P.A. (MCNT), was similar to the CAC initiatives that were described in a previous study.[28] To summarize, Cigna paid MCNT a care coordination fee in addition to standard FFS payments. In the first year of implementation, the amount of the fee was based on an estimate of the projected benefits to Cigna's patients, and in subsequent years, the payments were supplemented based on a formula that employed cost and quality measurements from the prior year. Cigna also supplied MCNT with reports on their patients to monitor progress and to identify those most likely to benefit from special assistance.

In return, MCNT took steps to provide Cigna patients with a level of care consistent with a patient-centered medical home. MCNT hired a nurse who served as an embedded care coordinator for Cigna patients, with primary activities that included the following: hospital discharge coordination for patients at increased risk of readmission, outreach to patients identified through Cigna's predictive modeling programs as likely to incur high medical costs, and patient education and coaching regarding gaps in care, such as lack of preventive care or medication adherence. The ar-

TAKE-AWAY POINTS

Despite the proliferation of private accountable care organizations, few studies have examined whether they yield potential cost savings relative to fee-for-service medicine. We tested whether a shared savings contract between a large insurer and a multi-clinic physician practice saved money over a 2-year period.

▸ Cigna's Collaborative Accountable Care initiative achieved a 5.7% reduction in net spending per patient for 2010 to 2011, relative to what spending would have been without the initiative.

▸ Significant cost savings, relative to the control group, were achieved with inpatient facility, outpatient facility, and other medical service payments.

▸ About half of the savings resulted from using lower-priced sources of care.

rangement also included active use of Cigna's preferred provider list for referrals. A referral template in MCNT's electronic health record (EHR) identified preferred specialists based on their in-network and value-based designations. MCNT providers and staff were also educated on the importance of in-network usage and how to use the template in the EHR.

METHODS

Study Population

MCNT had 141 primary care physicians (PCPs) in 42 practices, treating 7109 patients covered by Cigna in the Dallas–Fort Worth area in 2010. We compared the expenditures for these patients to Cigna patients who were aligned with other PCPs in the same geographic region between 2009 and 2011. This control group contained 192,655 patients in 2010. Study and control group patients were included only if they were aligned to PCPs and had 12 months of eligibility in any of the 3 years; there were no age restrictions. The methodology for aligning customers to PCPs has been described in a previous study.[28] All payments to both groups were FFS. The data sources were the Cigna claim line and enrollment databases, contracts between Cigna and MCNT, and Cigna fee-payment reports.

Study Design

The study design closely follows that used by previous researchers to analyze the effects of the Massachusetts BCBS Alternative Quality Contract.[26,27] We compared changes in total spending pre-intervention versus post intervention for the CAC intervention patients versus the control group of patients in other Texas clinics. In this difference-in-differences analysis, the pre-intervention period is 2009 and the postintervention period is 2010 to 2011.

We decomposed the overall 2-year effect on spending into year 1 and year 2 effects. We also decomposed the spending effect by clinical category, as defined by the Berenson-Eggers Type of Service (BETOS) classification system,[37] and by site and type of care. We describe our methodology for assigning claims to BETOS categories in **eAppendix 1** [eAppendices available at **www.ajmc.com**]. We then decomposed the spending effect result into a price effect and

TABLE 1. Characteristics of the Study Population

Characteristic	Cigna Patients at Medical Clinic of North Texas (CAC intervention)		Cigna Patients at Other Clinics in North Texas (control)	
	Pre-CAC 2009	Post CAC 2010-2011	2009	2010-2011
Characteristic				
Age, years	37.1	35.3	30.6	31.5
Female, %	55.4	51.8	52.0	51.7
Health Risk Score				
Mean	1.42	1.51	1.26	1.35
Interquartile range	0.28-1.69	0.23-1.73	0.21-1.47	0.16-1.53
Cost sharing[a] (%)				
Low cost sharing	20.9	17.8	23.7	18.9
Typical cost sharing	62.6	50.0	53.5	49.9
High cost sharing	6.4	16.6	9.9	16.9
Undefined	10.2	15.5	13.0	14.3
N	8266	7171	180,278	185,561

BETOS indicates Berenson-Eggers Type of Service (classification system); CAC, Collaborative Accountable Care; MCNT, Medical Clinic of North Texas, P.A.

[a]Cost sharing was assigned based on the mean percent paid out of pocket for all individuals in the sample covered by the same account plan.

a utilization effect by repricing claims for each service to their median prices across all providers in 2011. Spending results generated using standardized claims reflect only differences in utilization.

Variables

The dependent variable was aggregate medical spending per enrollee (in 2011 dollars) per 6-month period. Total medical costs included allowable charges typically covered under medical plan benefits (eg, inpatient facility, outpatient facility, professional, ancillary expenses); pharmacy expenses were not included. The care coordination fees that were in the claims were included in the charges for professional services. Medical spending included enrollees' cost sharing. Aggregate medical spending was truncated at $100,000 for each patient in a given time period.

We controlled for age categories, interactions between age and sex, the patient's retrospective risk score, and secular trends. We also categorized patients based on the cost-sharing characteristics of their insurance plan benefits. The cost-sharing category of each plan was based on the mean percent paid out of pocket for all individuals in the sample covered by the same set of benefits. Sets of benefits with fewer than 100 customers were assigned to the "undefined" category due to insufficient sample size.

Retrospective risk scores were calculated from the medical claims using commercially available software (Symmetry Episode Risk Groups, release 7.5 [Optum, Eden Prairie, Minnesota]). Claims for the current year were aggregated for each individual,

creating a yes/no decision on 167 medical condition categories (eg, acute bronchitis, malignant neoplasm of the breast), called Episode Risk Groups (ERGs). Each ERG has a relative risk value, and the sum of these values is the risk score. The relative risks were derived from claims costs and utilization in a managed care population with more than 8 million members.

Statistical Analysis

We analyzed spending (in 2011 dollars) at the semi-annual–enrollee level using a multivariate linear model with propensity weights calculated using age, sex, risk, and cost sharing (eAppendix 2). Additional independent variables included indicators for intervention status (MCNT vs non-MCNT), 6-month period, the postintervention period, and the interaction between the postintervention period and the intervention. This final indicator produced our initial estimate of the policy effect.

However, not all of the care coordination fees were embedded in the claims. Cigna was in the early stages of developing the CAC program, which led to delays in some payments. Therefore, we adjusted the regression estimate of the overall 2-year effect of the program for the additional care coordination fees that Cigna paid to MCNT that were not part of the claims data. We lacked sufficient information to conduct a similar adjustment of the regression estimates of the program effects by BETOS categories or site and type of care.

Standard errors were robust, based on clustering at the practice level.[38,39] We tested the sensitivity of our results to restricting the analysis to patients who were continuously covered by Cigna for all 3 years of the study. We also tested omitting the adjustment for cost sharing and omitting the propensity weights.

RESULTS

Table 1 provides descriptive statistics comparing the treatment and control groups. Prior to the implementation of the CAC initiative, the MCNT clinic treated 8266 Cigna patients in 2009, and 7171 patients after the initiative was introduced. The experiences of these patients were compared with that of 180,278 Cigna patients treated by other providers in north Texas in 2009, and 185,561 patients in 2010 to 2011. Patients treated by the MCNT clinic were slightly older than patients covered by Cigna in other parts of north Texas, which translated into slightly higher risk scores. These differences are accounted for in the regression analyses. The truncation of medical spending in a given 6-month

TABLE 2. Change in Average Healthcare Spending per 6-Month Interval in Intervention Cohort and Control Groups, to Evaluate Cigna CAC Initiative at MCNT

	MCNT (intervention)		Non-MCNT Groups (control)		Between-Group Difference	Between-Group Difference by Year	
	Pre- (2009)	Post (2010-2011)	Pre- (2009)	Post (2010-2011)	Average 2-Year Effect	Year 1 (2010) Effect	Year 2 (2011) Effect
Category/site and type of care							
Total 6-month spending ($)	1968	1764.67	1877.21	1802.20	−128.30***	−23.7	−236.13***
After out-of-claim fees[a]					−106.25		
By BETOS category ($)							
Evaluation and management	565.62	514.46	536.21	485.09	−0.04	29.72***	-30.73***
Procedures	428.77	368.29	399.62	380.84	−41.70***	−29.59***	−54.19***
Imaging	258.25	235.64	261.13	246.16	−7.64	1.56	-17.13 **
Test	178.99	179.73	179.47	184.92	−4.71*	2.43	-12.07***
Durable medical equipment	166.69	137.11	149.62	141.17	−21.13***	6.81	−49.93***
Other	199.44	148.57	188.12	180.30	−43.05***	−49.51***	-36.39***
Unclassified	195.79	189.36	187.36	191.44	−10.50*	15.44**	-37.24***
By site and type of care ($)							
Professional payments	840.37	739.17	819.73	738.21	−19.68	−10.16	−29.49**
Inpatient facility	475.95	403.41	427.57	391.91	−36.88***	43.11***	−119.33***
Outpatient facility	492.41	475.14	472.11	495.62	−40.77***	−18.52	−63.71***
Other medical service payments	197.59	158.81	195.01	188.12	−31.89***	−38.93***	−24.62***

BETOS indicates Berenson-Eggers Type of Service (classification system); CAC, Collaborative Accountable Care; MCNT, Medical Clinic of North Texas, P.A.
"*" indicates P <.05; "**" indicates P <.01; "***" P <.001.
[a]The estimated effect of the CAC initiative was adjusted for fees paid to MCNT that were not included in the 2010 to 2011 claims.

period, at $100,000, was necessary for only 5 observations in the sample. All of these observations were in non-MCNT clinics, and spending exceeded $1 million in each case.

The first row of **Table 2** indicates that overall, the average 6-month expenditures declined between 2009, and 2010 to 2011, for patients covered by Cigna in the Dallas–Fort Worth area in both MCNT and non-MCNT clinics. The difference-in-differences analysis tests whether the decline in spending for MCNT under the CAC initiative was greater than the decline for non-MCNT clinics, after controlling for other factors that might explain observed spending patterns during the study period.

After implementation of the CAC initiative, average healthcare spending fell substantially for patients associated with an MCNT clinic, but declined only slightly for enrollees in the control group. Overall, from 2010 to 2011, statistical estimates indicated that the intervention was associated with a $128.30 ($P$ <.001) decrease in average spending per enrollee per 6-month period, relative to what spending would have been without the intervention (**Figure** and Table 2). This decrease was a 6.5% reduction compared with what the spending would have been without the intervention. Further analysis indicates that most of the cost savings achieved by MCNT occurred during 2011. Spending per 6-month period did not change significantly between 2009 and 2010, but fell by $236.13 from 2009 to 2011.

Because only a portion of the care coordination fees were included in the 2010 and 2011 claims, the estimates do not include all of the costs associated with the CAC initiative. After subtracting all the fees paid in 2010 and 2011, the average overall net savings per 6-month period in 2010 to 2011 was $106.25 (5.7%).

This reduced spending was evident in multiple BETOS service categories—procedures, durable medical equipment, and "other" spending—although there were noticeable differences in the percentage reductions in spending across these BETOS categories. Average spending on procedures fell 10.2% between 2009 and 2011, while spending for durable medical equipment fell 13.4% and spending on "other" services fell 22.5%. The "other" services BETOS category is heterogeneous and includes ambulance services, as well as chemotherapy and other drugs. In most categories, the spending declines were larger in magnitude in year 2 of the intervention compared with year 1. Moreover, the decline in spending was statistically significant for all 7 BETOS categories in 2011 versus 2009.

Inpatient and outpatient facility payments and other medical service payments for MCNT enrollees all experienced significant cost savings relative to the control group. The average 6-month cost savings were larger in magnitude in 2011 than in 2010. The percentage declines in inpatient and outpatient facility spending were similar in magnitude (8.4% and 7.9%, respec-

FIGURE. Change in Average Healthcare Spending per 6-Month Interval for MCNT Relative to the Control Group, Compared With 2009
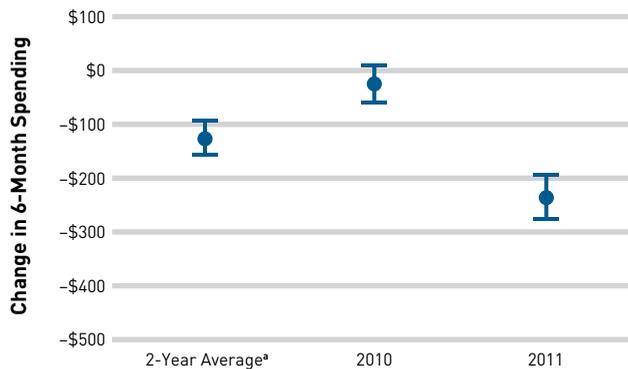
MCNT indicates Medical Clinic of North Texas, P.A.

[a]The 2-year average represents estimated savings after adjusting for out-of-claim Cigna Collaborative Accountable Care initiative fees.

Points represent estimated changes in healthcare spending. Top and bottom lines at the end of each point represent 95% CIs.

tively), while other medical services fell 16.7 percentage points. There was no significant decline in professional payments for patients covered by MCNT.

When we estimated cost savings using normalized prices, the estimated average 6-month savings over the period 2010 to 2011 fell to 3.7%. Therefore, some of the cost savings from the CAC initiative resulted from changes in service utilization. Of the remaining savings, approximately half resulted from using sources that had lower average costs per service.

The sensitivity analyses yielded cost savings estimates that were consistent with the main result. Limiting the sample to patients who were continuously covered by Cigna from 2009 through 2011 yielded an estimated average 2-year cost savings of 5.1% (−$103.76; P <.001). Omitting the adjustment for cost sharing implied an estimated cost savings of 6.8% (−$128.12; P <.001). Omitting the propensity weights implied an estimated cost savings of 8.1% (−$142.80; P <.001).

DISCUSSION

The 2-year estimate of 5.7% average net cost savings from the CAC initiative may seem large when compared with initiatives such as BCBS Massachusetts Alternative Quality Contract, which reportedly saved 2.8% over a similar time span; however, most of the patients with 2 years of utilization under the BCBS intervention were from practice groups that had prior experience managing risk-based contracts.[27] For patients treated by physician practice groups with no prior experience with risk-based contracts, the 2-year BCBS estimated savings was 8.2%, and, similar to the CAC

initiative, the cost savings amount was substantially larger in the second year compared with the first year.

Limitations

We would have liked to continue the analysis of MCNT and the CAC initiative beyond 2011; however, MCNT joined a larger integrated care organization, USMD Health System, in 2012, so data from later years may not be comparable. We shared our study results with MCNT's managers and asked them to comment on their experience with the CAC initiative. The managers stated that MCNT devoted additional unquantified resources, including analytics and managers' time, which were not fully covered by the care coordination fee paid by Cigna. MCNT managers stated that they were willing to do this because they recognized a change from volume to value among payers. Therefore, they viewed these additional costs as an investment in population health, which would be essential for future business.

Cigna bore additional costs to develop predictive models to assist MCNT and to develop the collaborative incentive relationship. Since then, Cigna has since been able to apply the tools developed for the MCNT relationship to over 140 incentive arrangements. Therefore, the marginal administrative cost of providing these tools to MCNT was likely minimal. It is possible that some other change in MCNT practices that occurred simultaneously with the CAC initiative could explain the cost savings identified in this study; however, MCNT management could not think of any other major changes in the practice that could explain the study results. Some offices expanded their hours during this time period, but the MCNT physicians could not see a link between this change and the measured savings.

Among BETOS categories, the 2-year average decline in spending for evaluation and management was statistically insignificant between 2009 and 2011, even though this category accounts for the most dollars spent among the 7 service categories. When spending was categorized by site and type of care, there was also no statistically significant average decline in professional payments from 2009 to 2011. Large and statistically significant reductions were observed for inpatient and outpatient facility spending, as well as other medical service payments. There was a similar finding when a risk-based contract was implemented among several hundred physicians by a health maintenance organization in the 1990's.[40] A conclusion in that study was that physician practices were less likely to decrease spending on services resulting in direct reimbursement to their own offices, and more likely to cut spending on services delivered to their patients by other healthcare providers. Results such as these suggest that physician-owned ACOs, such as MCNT, may be more effective in reducing spending than hospital-led ACOs.[11,41]

It is possible that the CAC initiative led MCNT physicians to provide services in their clinics that lowered the need for more expensive services from outside providers. This might have been

accomplished through preventive medicine or by performing procedures and tests in their offices that could have been referred. It is also possible that patients were referred to less expensive in-network or out-of-network providers or encouraged to use nurse practitioners instead of doctors or urgent care centers instead of emergency departments. Unfortunately, we do not have sufficient data to test these hypotheses.

A recent survey of private ACOs found that these organizations differ significantly in features, such as patient attribution and performance measurement and targets.[8] Given the many features in which contracts between physician practices and insurers can differ, more extensive comparisons of the Cigna approach, relative to other ACO and medical home models, should be conducted. The upfront funding of coordinated care and local benchmarking may be highly effective tools in achieving cost savings for many other physician practices.

CONCLUSIONS

Although many studies describe the potential advantages of ACOs, only a handful of papers document the actual performance of these organizations. We found that after 2 years, a private ACO model with an embedded care coordinator and a list of recommended providers led to an estimated average of 5.7% net cost savings compared with what costs would have been without the initiative. Both upfront funding of coordinated care with local benchmarking or the responsiveness of a physician-owned ACO versus a hospital-led ACO may have contributed to these cost savings. Given the wide variety of organizational and contractual differences across private ACOs, future research should aim to distinguish between these 2 potential cost-saving mechanisms and others to determine which ACO models are most cost-effective.

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eAppendix

eAppendix 1. Assignment of Claims to BETOS categories

Claims that contained a Healthcare Common Procedure Coding System (HCPCS) code were classified to a BETOS category using a crosswalk that was posted on the CMS website. The crosswalk has since been removed from the website, but is available from the corresponding author on request. For claims that only reported a revenue code, we consulted Medicare Cost Reports to find definitions for each revenue code. We then assigned each revenue code to a BETOS category based on these descriptions. There was no description in the CMS cost reports for a small fraction of revenue codes. For these cases, we relied on revenue code descriptions from a 2009 Blue Cross Blue Shield reporting manual.

eAppendix 2. Regression Specification

Propensity weights for the spending regressions were derived by estimating a logistic regression of the following form:

$$MCNT_i = \beta AGE_i + \gamma Female_i + \delta RISK_i + \rho Costshare_i + \epsilon_i$$

Where $MCNT_i$ is a 0/1 indicator for whether patient i is an MCNT patient, and AGE_i is a column vector of indicator variables for the patient's age (0 to 1; 2 to 18; 19 to 29; 30 to 39; 40 to 54; 55 to 64; 65 to 74, with 75+ as the excluded category). The variable $Female_i$ is also a 0/1 indicator. The vector $Risk_i$ includes the retrospective risk score for the patient and its squared value. The variable $Costshare_i$ is a column vector of indicator variables for the average percent of annual health expenditures for the patient's plan that are paid out-of-pocket (7 to 18%, and >18%, with <7% as the excluded category. Plans with <100 individuals (which generates noisy estimates) are distinguished using another 0/1 indicator variable). The coefficients from the logistic regression were used to calculate each individual's probability of being an MCNT patient. This predicted probability was used as the propensity weight for the non-MCNT (control) patients in the spending regression described below, while one minus this probability was the propensity weight for the MCNT patients. The spending regression takes the following form:

$$\frac{6\ month}{spending_i} = \alpha + \beta AGE_i + \gamma Female * AGE_i + \delta Risk_i + \theta Post_i + \rho PERIOD_i +$$

$$\tau MCNT_i + \varphi Post * MCNT_i + \epsilon_i$$

where $\frac{6\ month}{spending_i}$ is the aggregate 6 month medical spending for enrollee i, α is a constant, and AGE_i is the same column vector of 0/1 age indicator variables used in the logistic equation. The regression includes an interaction of the *Female* indicator variable with the *AGE* indicators. The variable $Risk_i$ is the retrospective risk score for the patient (based on claims for the calendar year containing the 6-month period of analysis), $Post_i$ is a 0/1 indicator for observations occurring in 2010 or 2011 (as opposed to 2009), $PERIOD_i$ is a column vector of 1/0/-1 design variables for the 6-month period the observation lies in, and $MCNT_i$ is a 0/1 indicator for MCNT patients. The variable $Post * MCNT_i$ is the difference in differences effect, the interaction of MCNT patient status and the *Post* period effect.

The analysis used linear regression with propensity weights derived from the logistic regression described above. Each individual was aligned with a physician practice, and clustering on these practices was used to estimate the standard errors. Stata version 13.1 was used. The Stata code that was used to obtain these estimates is available from the authors upon request.