



Assessing the Short-Term and Long-Term Impacts of Introducing Fixed-Value Physician Fee Schedules in Workers Compensation

Presented by Harry Shuford
Based on analysis by Frank Schmid
and Nathan Lord

CAS RPM
March 13, 2013
Huntington Beach, CA



Assessing the Short-Term and Long-Term Impacts of Introducing Fixed-Value Physician Fee Schedules in Workers Compensation

- What Are the Objectives for Fee Schedules?
- What Can We Learn From Previous Studies?
- Medical Indexes—An Enhanced Approach
 - The Data and the Methodology
- Evaluation of Fee Schedule Introductions
 - Immediate Impact
 - Price Departure Versus the Price Level Response
 - Benchmarking With a Time Series Forecast
 - Long-Term Effect
- Conclusion



What Are the Objectives of Fee Schedules

- The key objective: to control growth in medical severity
 - In contrast to, for example, “usual and customary” or “reasonable and necessary” guidelines, it is believed that fee schedules that impose a firm upper limit (i.e., maximum allowable reimbursement or fixed-value MAR) will be more effective in constraining the growth in medical costs by placing limits on price escalation
- There are two primary concerns:
 - The impact on prices actually paid
 - Possible offsetting changes in the utilization of services
 - Short term (“shock” to the system)
 - Long term (behavioral change)



The Role of Medical Price Controls

The Medical CPI Is Consistently Greater
Than the Overall CPI

This Has Been Interpreted as Indicating That
Medical Price Inflation is a Key Contributor to the
High Growth Rate in Medical Costs

Binding Price Controls Undoubtedly Restrain
the Contribution of Price Increases to the
Growth of Medical Costs



The Role of Medical Price Controls

A Critical Question:

Will Medical Providers Attempt to Offset the Impact of Binding Price Controls by Increasing Utilization of Services?



What Can We Learn From Previous Studies?



What Can We Learn From Previous Studies?

Evaluating Impact of Fee Schedules

Two Standard Approaches

1. Cross-State Studies

2. Single-State Studies



What Can We Learn From Previous Studies?

Cross-State Studies

At a given point in time, compare states with and without a physician fee schedule

- Possibly most suited for discerning the long-term effects of fee schedule introductions
 - Especially if the fee schedules have been in place for a period of time
- Challenges:
 - Isolating the contribution of a physician fee schedule from other cost containment measures (e.g., utilization guidelines) can be difficult
 - Most states now have fixed-value MAR-based fee schedules, limiting ability for robust comparisons



What Can We Learn From Previous Studies?

Single-State Studies

- Compare experience before and after the fee schedule introduction
Alternatively,
- Compare workers compensation medical care to Group Health

- Challenges in isolating the contribution of a physician fee schedule
 - Experience over time also likely to be impacted by the introduction and changes in:
 - Other cost containment measures
 - Other legislative and regulatory reforms
 - Broader changes in economic conditions and healthcare markets



Not a New Question A Quarter Century of Studies

- Cross-State Studies
 - Borba, 1986
 - National Council on Compensation Insurance, 1989
 - Boden and Fleischman, 1989
 - Durbin and Appel, 1991
 - Pozzebon, 1994
 - Robertson and Corro, 2007
- Single-State Studies
 - Minnesota Department of Labor and Industry, 1990
 - Roberts and Zonia, 1994, on Michigan
 - Radeva et al., 2010, on Illinois
 - Radeva et al., 2010, on Tennessee



Why Might Provider Behavior Change?

- Economic Theory
 - When prices change, supply changes should favor things (goods, services) whose relative prices increased
- Behavioral Economics
 - Income targeting would mean that when prices increase the supply of the relevant goods and services would fall
- Established Medical Practices
 - Treatment patterns would change only minimally



Utilization Effects in Earlier Studies

Only two of the **cross-state studies** investigate the possible impact due to differences in utilization.

- Borba (1986):
 - Report that the number of office visits is higher in fee schedule states than in non-fee schedule states but ...
 - Caution that this finding may be related to differences in compensability associated with waiting periods
- Robertson and Corro (2007):
 - Study a dozen common workers compensation injuries for 14 jurisdictions
 - Find little evidence of an impact of fee schedules on utilization

Utilization Effects in Earlier Studies

Only two of the **single-state studies** address possible utilization effects of fee schedule introductions.

- Roberts and Zonia (1994):
 - Discover a decrease in the number of procedures to treat patients when comparing the post-implementation time window to the pre-implementation time interval surrounding the Michigan fee schedule implementation
 - Although this decrease in the supply of medical care is not statistically significant, in the context of a statistically significant decrease in the duration of treatment, the finding points to a reduction in utilization
 - Alternatively, the observed declines may reflect a shift in treatment practices:
 - The authors document a “dramatic change ... in the use of procedures for which there was no specific maximum fee in the fee schedule”
- Radeva et al. (2010):
 - State that, following the Tennessee fee schedule introduction, “utilization by major nonhospital services ... did not change significantly”

Utilization Effects in Earlier Studies

There is no compelling evidence for a systematic effect of fee schedule introductions on the utilization of medical care in workers compensation.





Medical Indexes for Two States

Pre- and Post-MAR-Based Fee Schedules

Tennessee—2005/2006



The Case Studies

Tennessee

- Tennessee introduced a fixed-value MAR physician fee schedule in workers compensation effective July 1, 2005—the fee schedule became mandatory on January 1, 2006
- Prior to the fee schedule introduction:
 - Reimbursement was subject to usual and customary practices ...
 - As defined by the Medical Care and Cost Containment Committee



The Case Studies

Tennessee

The fixed-value MAR prices in the Tennessee fee schedule are multiples of the applicable Medicare fee schedule, where the multiplicative factors vary by procedure.

Reimbursement of procedures not explicitly covered by the fee schedule is limited to the lesser of usual and customary and 100% of Medicare



The Case Studies

Tennessee

Other Medical Cost Containment Provisions:

- Tennessee limits provider choice; this legal provision had already been in place when the fee schedule was implemented
 - The employee has the ability to choose a physician from a list of eligible providers supplied by the employer
 - The physician may be changed during ongoing treatment only with consent from both the employee and the employer



Medical Indexes for Two States

Pre- and Post-MAR-Based Fee Schedules

Illinois—2006



The Case Studies

Illinois

- Illinois introduced a fixed-value MAR physician fee schedule in workers compensation effective February 1, 2006; prior to this legislative provision taking effect, reimbursement was subject to being reasonable and necessary
- When the employer did not agree to the expenses as being reasonable and/or necessary, the employee could file a petition asking the Workers' Compensation Commission to decide the disputed issue



The Case Studies

Illinois

- The Illinois fee schedule for 2006 set the MAR of medical services to 90% of the 80th percentile of charges observed from August 1, 2002 through August 1, 2004
- These charges were adjusted for changes in the CPI for the period August 1, 2004 through September 30, 2005
- This interim step toward a full fixed-value MAR highlights the idea that actual reimbursements can be characterized by some sort of distribution



The Case Studies

Illinois

Permissible Sources of Variation:

- The MAR varies by geozip, which is defined by the zip codes that share the same first three digits
 - The geozip is identified by the site where the treatment occurred
 - For procedures for which the physician fee schedule does not stipulate a fixed-value MAR, the default reimbursement is set to 76% of actual charge
 - Employers or insurance carriers may contract with providers for reimbursement rates (i.e., prices) higher than fee schedule

The Case Studies

Illinois

Other Cost Containment Measures:

- At the time the fee schedule took effect, the employee was entitled to two choices of medical provider and their respective chains of referrals
 - More recently, upon approval by the Department of Insurance, the employer may sponsor a Preferred Provider Program (PPP)
 - Where implemented, the PPP is the employee's first provider choice, by default





Medical Indexes—An Enhanced Approach

The Data Used to Create the Indexes



The Data Set

The study uses data from two sources:

- Physician Fee Schedule Data
 - From Ingenix Inc. (now known as OptumInsight, Inc.)
- Actual Prices Paid and Utilization
 - Based on observed medical transactions associated with workers compensation claims ...
 - For the time period January 1, 2000 through December 31, 2010
 - Provided by a set of insurance carriers
 - Includes the jurisdiction state criterion and provider zip code information, which are used to link medical transactions to a given state



How Representative Is the Workers Compensation Data?

- There is no data for second injury funds operated by Tennessee and Illinois
 - These are not material
- The carriers contributing to the medical transaction data account for just over 30% of the market as measured by written premium
 - Most are larger companies that may be more likely to have provider networks
 - Self-insureds are not captured in the data



How Comprehensive Is the Scope?

This study is focused on physicians and other individual healthcare providers.

- The data set excludes transactions associated with medical services provided by hospitals and ambulatory surgical centers, but ...
- Includes transactions related to services delivered by physicians (as the provider type) at these places of service

Raw data were cleansed.

- The medical transactions data were edited using expert knowledge on billing and reimbursement practices
- The data set was cleansed using statistical tools including outlier detection



What Medical Services Are Examined?

Grouping the Transactions Into Standard Medical Service Categories

- American Medical Association (AMA) five service categories:
 - Evaluation and Management Services
 - Surgery
 - Radiology
 - Pathology and Laboratory
 - Medicine
 - Physical Medicine is broken out as a subcategory of Medicine
- Pathology and Laboratory tends to be sparsely populated and, although included in All Categories, is not examined as an independent service category
- Transactions related to Anesthesia were excluded due to difficulties in quantifying the units of service associated with the individual records

How Were the Transactions Grouped?

For the purpose of this study, medical services are identified by a combination of CPT code and modifier.

- Only modifiers that are recognized by fee schedules are considered for transactions associated with one of the identified medical services
- The MAR may vary
 - By geozip (geographic areas identified by arrays of zip codes; Illinois only) and place of service
 - In such cases, the MAR is calculated for any given month as a weighted average across geozips and places of service, where the weights are the number of units of service provided

Some Necessary Nitty-Gritty Detail

- For a given medical service, the study utilizes a MAR only if the fee schedule specifies a dollar amount (i.e., a “fixed-value MAR”)
- When a fee schedule change occurs mid-month, for the purpose of calculating the average MAR of a given medical service for that month, the pertinent fee schedules are prorated based on the numbers of units of service provided pre and post the date of change
- Because the MAR that applies to a given medical transaction depends on the place of service and (in Illinois) across geozips, the average monthly MAR for a given medical service may vary over time even if there is no change in the underlying fee schedule
 - This is because the distribution of transactions by place of service and geozip may change from month to month (i.e., a mix change)



The Distribution of Actual Prices Paid

A Sidebar

- While not central to this study, the preliminary analysis did include efforts to examine the distribution of actual prices (i.e., reimbursements) paid
- In general, the distributions for the individual CPTs were multimodal
- The distributions are closer to bar graphs than line charts with aggregations around discrete values of specific fractions of fixed-value MARs
- There were similar quasi-bar graphs in the limited number of calculations for services that did not have fixed-value MARs—which could reflect pricing that was based on negotiated discounts from Medicare fees





Medical Indexes—An Enhanced Approach

Computing the Indexes



Computing the Medical Indexes Prices and Quantities

Measuring Actual Behavior

- Based on monthly state-level price and quantity indexes of medical services provided by physicians in workers compensation based on actual paid amounts ...
 - These indexes are Fisher indexes
 - Allows for an accurate decomposition of changes in expenses into changes in prices and quantities

Measuring the Medical Fee Price

- Based on a Fisher price index at fee schedule—this price index comprises only medical services subject to a fixed-value MAR
 - The actual and fee schedule indexes are calculated for the individual AMA categories, the Physical Medicine subcategory, and All Categories

Computing the Medical Indexes

Utilization and Severity

Utilization

- A utilization index is computed by dividing the Fisher quantity index by the number of active claims
 - This index measures the average number of transactions per claim
 - For this calculation, a claim is considered active (in a given service category or overall) if there was a transaction (in a given service category or, when overall, in any given service category) associated with this claim that was included in the price index for the month

Severity

- The severity index is calculated as the product of the Fisher price index (for prices actually paid) and the utilization index
 - This measures the average cost of medical services per claim (i.e., severity) for all claims that received medical treatments in the period

Seasonality

- To the degree that the delivery of physician services is more intensive early in the life of a claim, seasonal variation in claiming patterns will cause seasonality in severity



Assessing the Impact of the Introduction of a Fixed-Value Physician Fee Schedule

Short-Term Impacts



Estimating the Short-Term Impact

- The impact of fee schedule introductions is analyzed by examining changes before versus after the fee schedule effective date
- The analysis recognizes that behavior may change in anticipation of the implementation of the fee schedule
 - The counterfactual (behavior if no fee schedule) is estimated using a time series model that is estimated on observed behavior in utilization and severity over a multi-year time period prior to the implementation date
 - Thus, possible changes in behavior on the part of claimants, physicians, and insurers associated with the anticipation of the fee schedule should have only a negligible impact on the measured effect

Estimating the Short-Term Impact

The analysis also utilizes a three-month post implementation period to allow for the possibility of a lagged response in observed behavior to the fee schedule implementation.

- The differences between the observed values (net of noise) and time series model forecasts of the severity and utilization indexes in the third month of fee schedule operation are estimates of the impacts of the fee schedule implementation
- The price response to the introduction of the fixed-value MAR fee schedule is estimated based on the difference between the severity and utilization responses

Calculating the Price Departure

- Price departure measures the relative difference between actual prices paid and the prices specified in the fee schedule
- This is calculated as the ratio of the total value of all transactions at actual prices paid to the value of all transactions volume if fee schedule prices had been paid, minus 1
 - For example, a price departure of minus 0.05 (or, equivalently, a negative 5%) states that the actual amounts paid are 5% below what would have been paid on the same transactions at fee schedule prices
 - Note that this is the ratio of total dollars spent versus what would have been spent at fee schedule prices, not the ratio of prices per se

Calculating the Price Departure

The indexes used in the analysis also include a significant range of medical transactions not subject to a fixed-value MAR.

- For these transactions, the actual paid amounts are used for the amounts at fee schedule in the denominator (these are the same as the amounts used for these transactions in the numerator—i.e., no departure)
 - This seems appropriate because medical services that are not subject to a fixed-value MAR are subject to “soft” price ceilings that are defined as a percentage of charges or are subject to usual and customary guidelines (which may be defined as a function of charges)

Calculating the Price Departure

- Similar to the price, utilization, and severity indexes, price departure is calculated on a monthly basis for All Categories, the individual AMA categories, and Physical Medicine
- Note that changes in the difference between the price indexes based on actual prices paid and on fee schedule prices do not map exactly into changes in price departure due to the change in the mix of services
 - For instance, for a given set of prices, the price index does not respond to changes in quantities
 - By contrast, the price departure may increase for given reimbursement practices and a given fee schedule if the distribution of transactions shifts in favor of medical services that exhibit a comparatively large spread between MAR and reimbursed amount

Price Indexes Versus Price Departures

The interpretation of price indexes and price departures is relatively straightforward.

- The indexes have a common base period; that is, they all have a value of 100 at the same point in time.
- The primary role of the indexes is to enable meaningful comparisons of cumulative **rates of changes** over time. In particular how actual prices paid change when the prices in the fee schedule change.
- Price departures measure **differences in the level of payments** at prices actually paid versus total payments on the same transactions if the fee schedule prices had been paid.
- This means that there will typically be a price departure even if the values of the two price indexes (actual paid versus fee schedule) are equal.
- The price departure will shrink when the index for actual prices grows faster than the index for fee schedule prices.

Estimating the Short-Term Counterfactual Time Series Model

- The time series model employed in this analysis is a univariate exponential smoothing state-space model called TBATS
- This model was developed by De Livera, Hyndman, and Snyder, 2011, and is available as part of the R package *forecast*
- TBATS stands for Trigonometric, Box-Cox transform, ARMA errors, Trend, and Seasonal components, which summarizes the basic characteristics of this model
 - The seasonal components of the model are based on a trigonometric specification, which distinguishes this approach from the competing BATS model—the trigonometric specification limits the number of parameters in the seasonal components of the model

Estimating the Short-Term Counterfactual Time Series Model

- The Box-Cox transform (which corrects for possible non-normality) was excluded in an effort to limit the number of parameters in the model
- Further, trend dampening was employed, although this may have little impact, given the short forecasting horizon of only three data points
- The number of seasonal periods was set to 12, thus acknowledging the monthly nature of the time series
- Auto-regressive moving average (ARMA) errors were permitted
- Automatic model selection was employed using the Akaike information criterion (AIC)





Assessing the Impact of the Introduction of a Fixed-Value Physician Fee Schedule

Picturing the Results



Picturing the Results

- What happens to prices paid?
 - The average reimbursement is generally below the MAR—a “price departure”
- What happens to utilization?
 - And, hence, severity





Assessing the Impact of the Introduction of a Fixed-Value Physician Fee Schedule

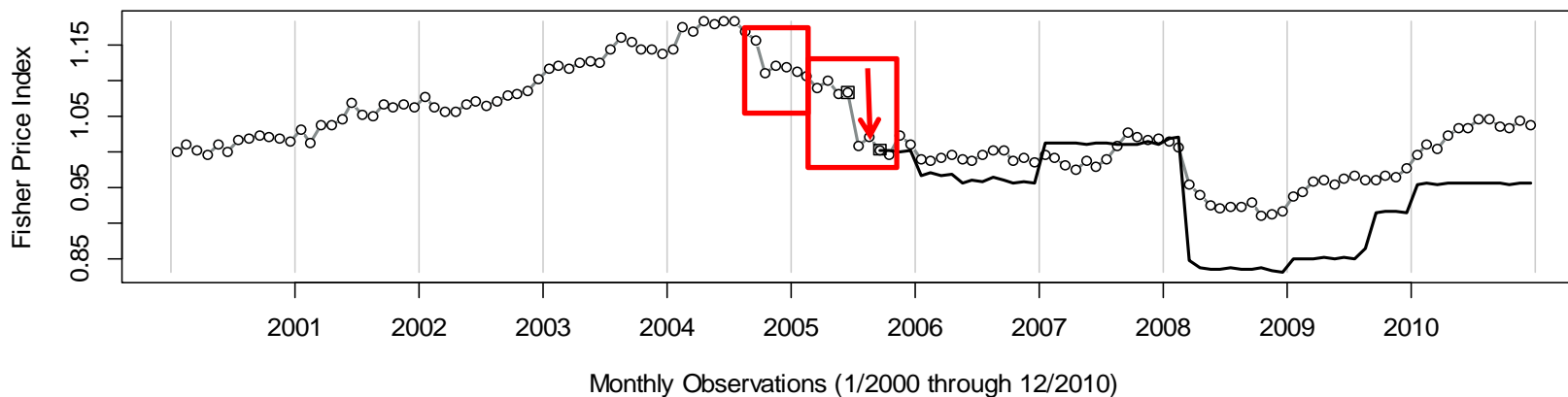
Short-Term Impacts

Tennessee



Tennessee

Price Indexes and Price Departure, All Categories



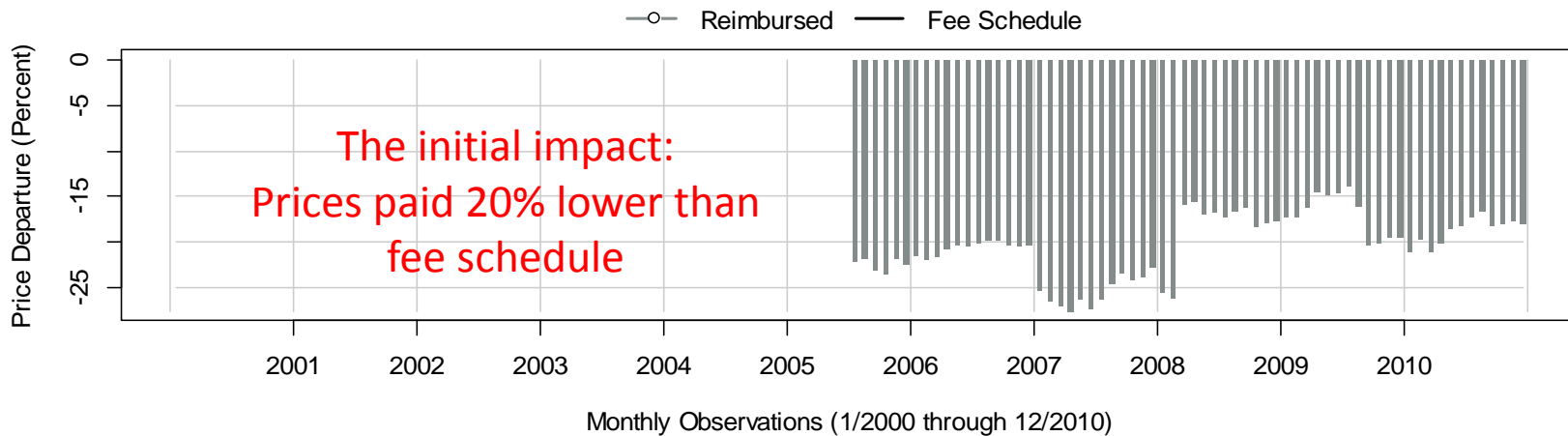
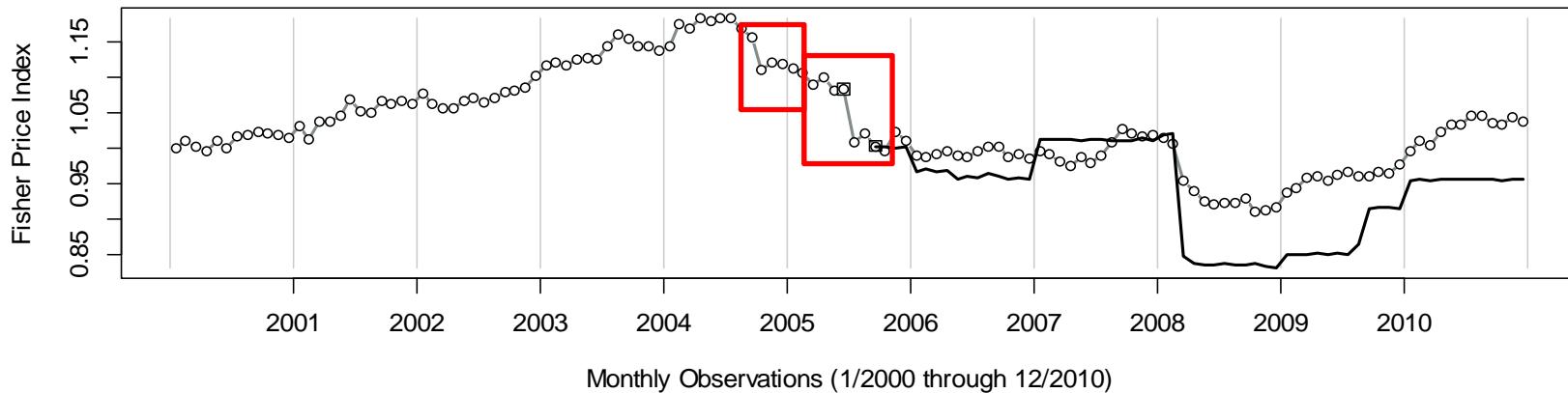
The initial impact:
Prices fall

Price indexes are shown at reimbursed amounts and at fee schedule. The price index at reimbursed amounts comprises all CPT codes, regardless of their fee schedule treatment. Price departure is the relative deviation of reimbursed amounts from MAR. The price departure computation is based on all CPT codes, implicitly assuming no price departure for CPT codes that are not subject to a fixed-value MAR.

Price indexes change only if prices change. Price departure, on the other hand, may change without prices changing. The price index at fee schedule starts in the third post-implementation month, which is September 2005.

Tennessee

Price Indexes and Price Departure, All Categories

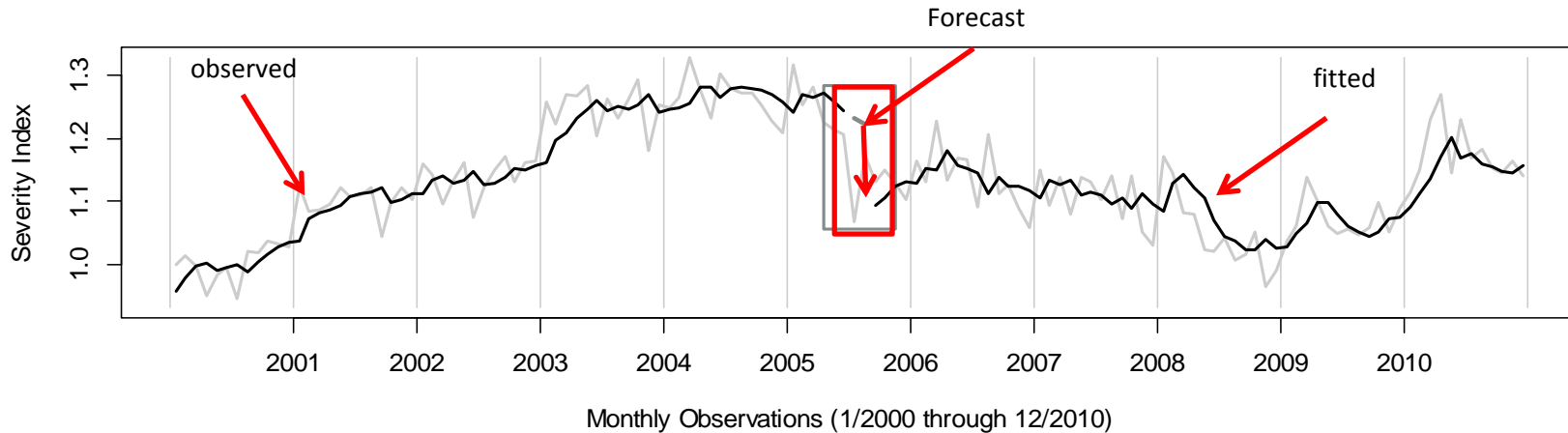


Price indexes are shown at reimbursed amounts and at fee schedule. The price index at reimbursed amounts comprises all CPT codes, regardless of their fee schedule treatment. Price departure is the relative deviation of reimbursed amounts from MAR. The price departure computation is based on all CPT codes, implicitly assuming no price departure for CPT codes that are not subject to a fixed-value MAR.

Price indexes change only if prices change. Price departure, on the other hand, may change without prices changing. The price index at fee schedule starts in the third post-implementation month, which is September 2005.

Tennessee

Severity and Utilization Responses, All Categories



The initial impact:
Severity falls

— Observed

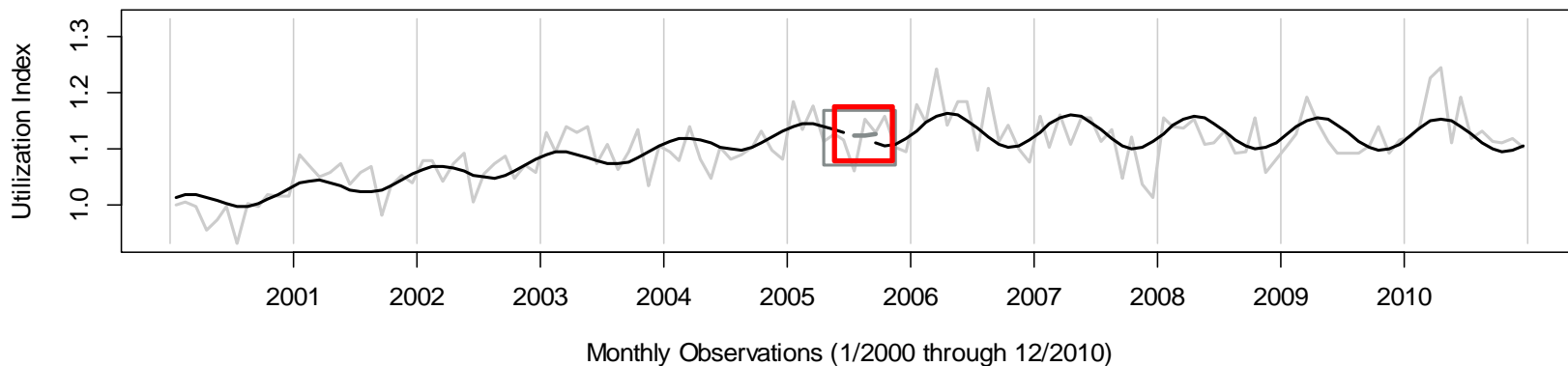
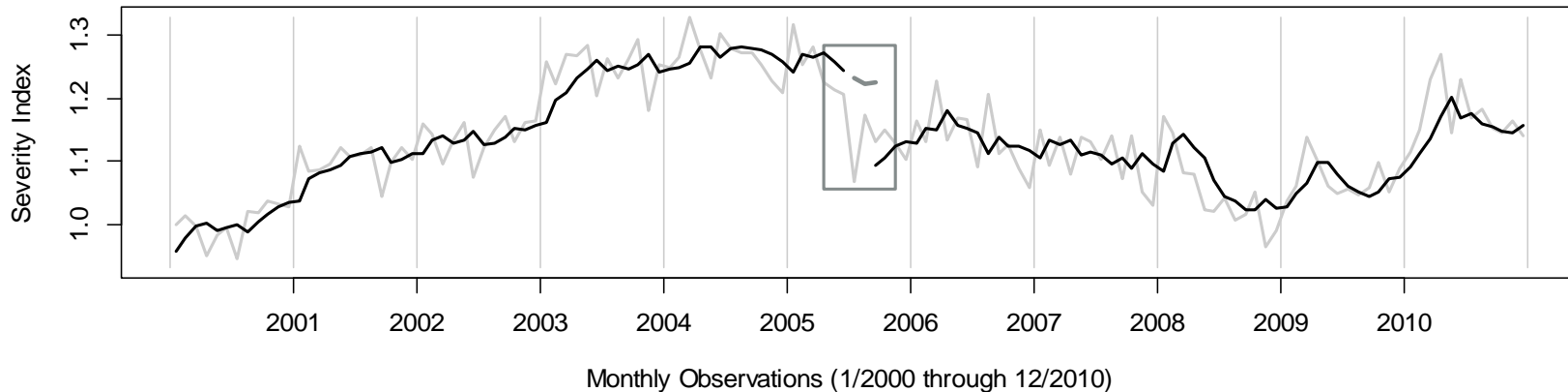
— Fitted

— Forecast

The severity index is the product of the Fisher price index and the utilization index. The utilization index equals the Fisher quantity index, normalized by the number of active claims. In this context, a claim is considered active (in a given service category or overall) if there was a transaction (in a given service category or, when overall, in any given service category) associated with this claim included in the price index for the month. The Fisher price and quantity indexes are computed at reimbursed amounts and comprise all CPT codes. The indexes in the top panel are shown as observed (gray, thin gauge), as predicted (black), and as forecast (gray, thick gauge). The gray box highlights the time surrounding the fee schedule introduction.

Tennessee

Severity and Utilization Responses, All Categories

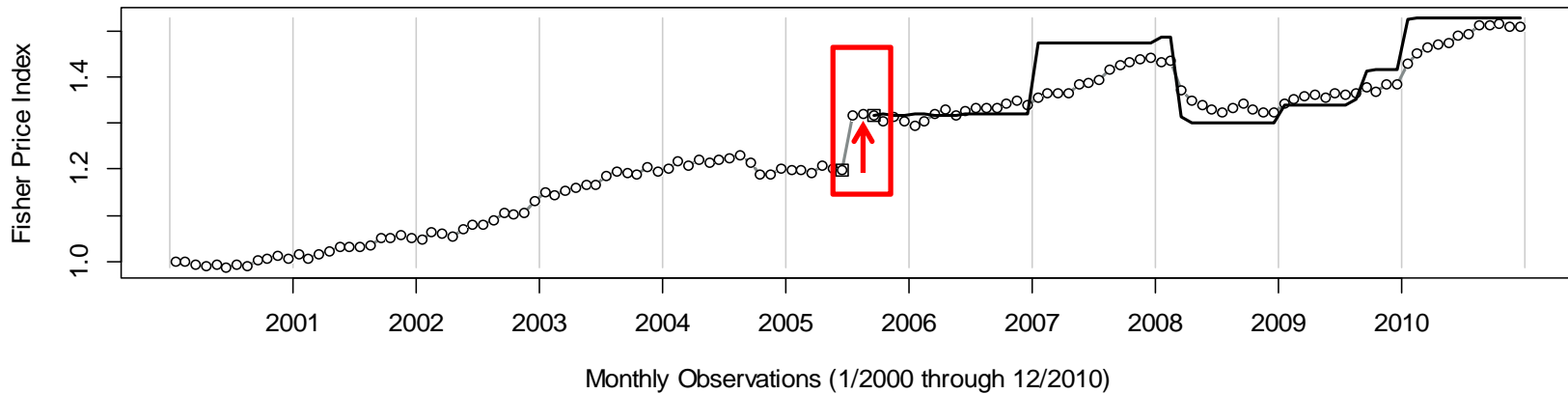


**The initial impact:
Utilization shows a slight decrease**

The severity index is the product of the Fisher price index and the utilization index. The utilization index equals the Fisher quantity index, normalized by the number of active claims. In this context, a claim is considered active (in a given service category or overall) if there was a transaction (in a given service category or, when overall, in any given service category) associated with this claim included in the price index for the month. The Fisher price and quantity indexes are computed at reimbursed amounts and comprise all CPT codes. The indexes in the top panel are shown as observed (gray, thin gauge), as predicted (black), and as forecast (gray, thick gauge). The gray box highlights the time surrounding the fee schedule introduction.

Tennessee

Price Indexes and Price Departure, Evaluation and Management Services



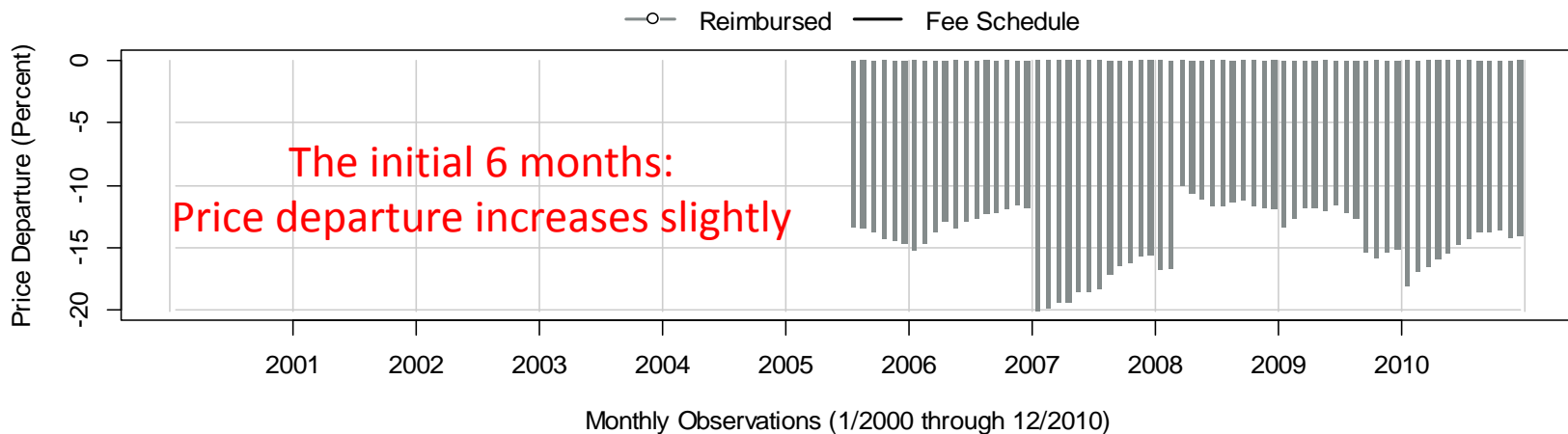
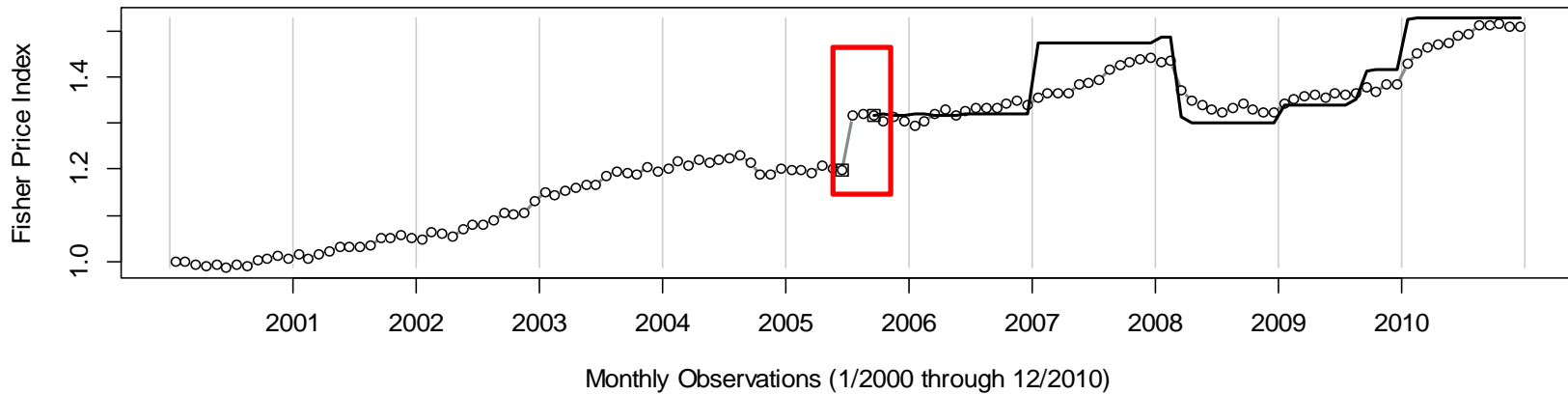
The initial impact:
Prices increase

Price indexes are shown at reimbursed amounts and at fee schedule. The price index at reimbursed amounts comprises all CPT codes, regardless of their fee schedule treatment. Price departure is the relative deviation of reimbursed amounts from MAR. The price departure computation is based on all CPT codes, implicitly assuming no price departure for CPT codes that are not subject to a fixed-value MAR.

Price indexes change only if prices change. Price departure, on the other hand, may change without prices changing. The price index at fee schedule starts in the third post-implementation month, which is September 2005.

Tennessee

Price Indexes and Price Departure, Evaluation and Management Services

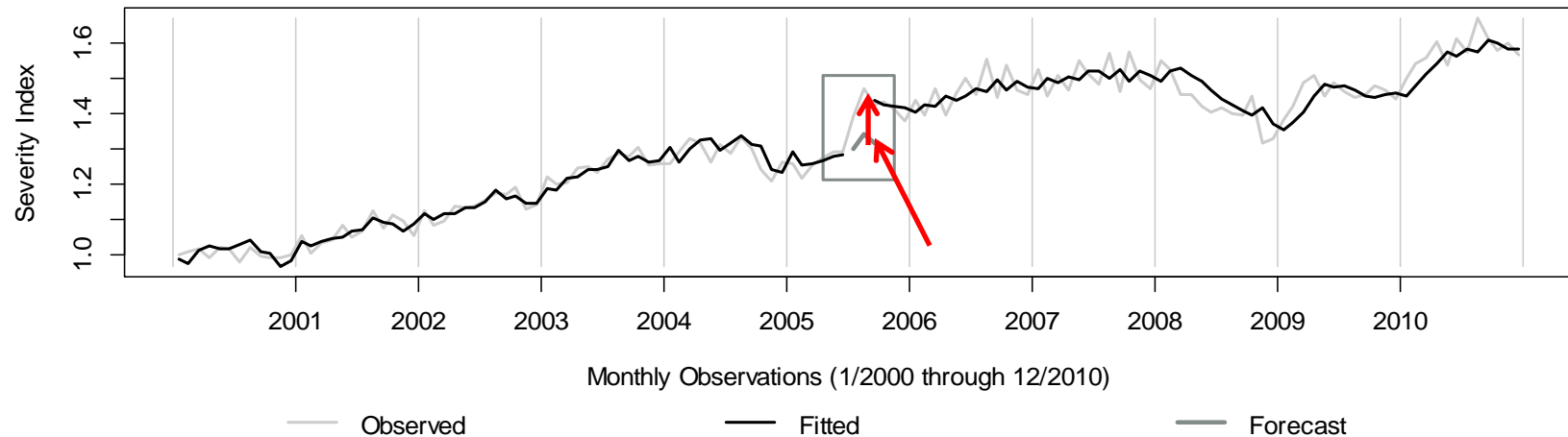


Price indexes are shown at reimbursed amounts and at fee schedule. The price index at reimbursed amounts comprises all CPT codes, regardless of their fee schedule treatment. Price departure is the relative deviation of reimbursed amounts from MAR. The price departure computation is based on all CPT codes, implicitly assuming no price departure for CPT codes that are not subject to a fixed-value MAR.

Price indexes change only if prices change. Price departure, on the other hand, may change without prices changing. The price index at fee schedule starts in the third post-implementation month, which is September 2005.

Tennessee

Severity and Utilization Responses, Evaluation and Management Services

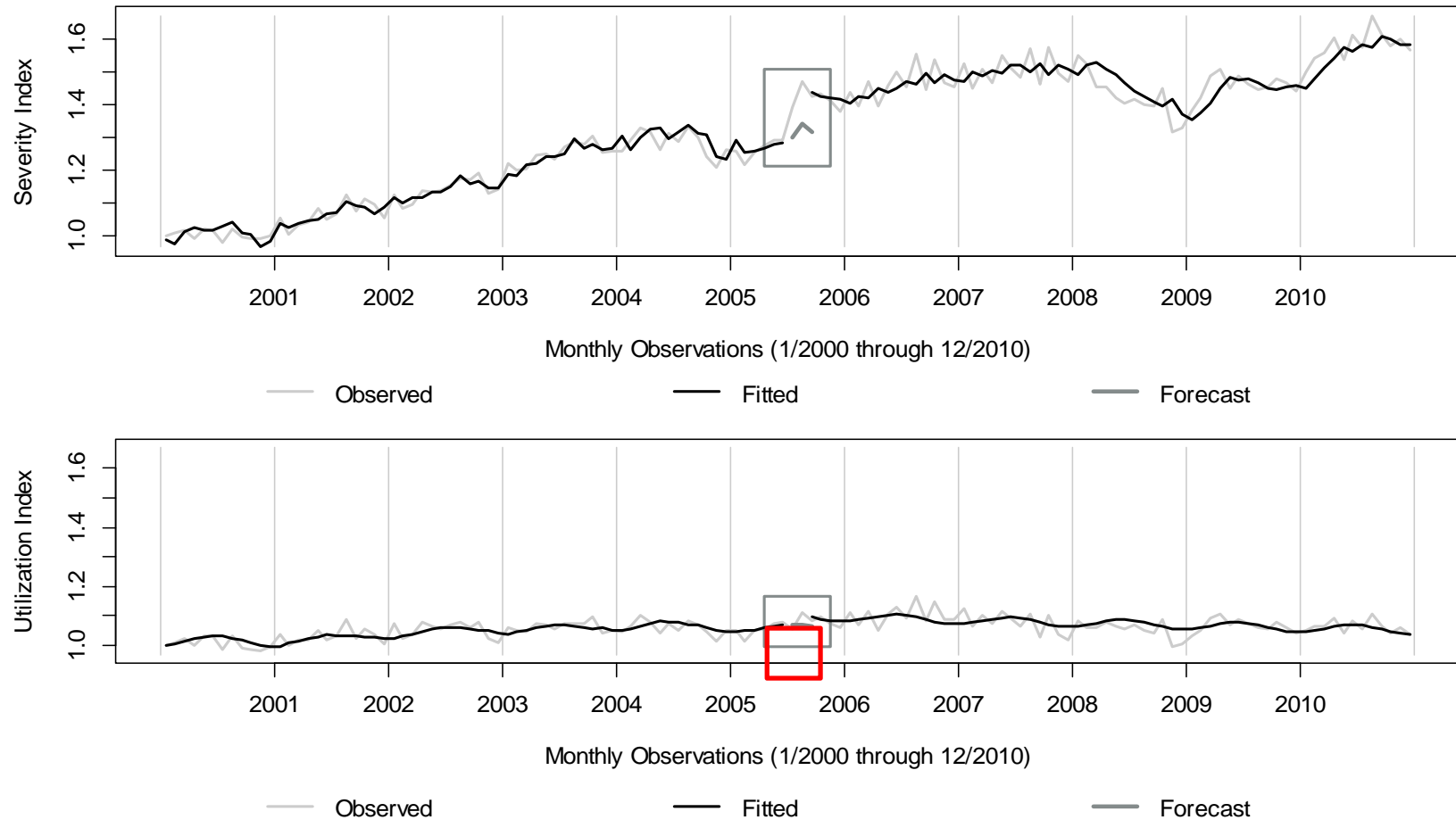


The initial impact:
Severity increases

The severity index is the product of the Fisher price index and the utilization index. The utilization index equals the Fisher quantity index, normalized by the number of active claims. In this context, a claim is considered active (in a given service category or overall) if there was a transaction (in a given service category or, when overall, in any given service category) associated with this claim included in the price index for the month. The Fisher price and quantity indexes are computed at reimbursed amounts and comprise all CPT codes. The indexes in the top panel are shown as observed (gray, thin gauge), as predicted (black), and as forecast (gray, thick gauge). The gray box highlights the time surrounding the fee schedule introduction.

Tennessee

Severity and Utilization Responses, Evaluation and Management Services



**The initial impact:
Utilization—slight increase**

The severity index is the product of the Fisher price index and the utilization index. The utilization index equals the Fisher quantity index, normalized by the number of active claims. In this context, a claim is considered active (in a given service category or overall) if there was a transaction (in a given service category or, when overall, in any given service category) associated with this claim included in the price index for the month. The Fisher price and quantity indexes are computed at reimbursed amounts and comprise all CPT codes. The indexes in the top panel are shown as observed (gray, thin gauge), as predicted (black), and as forecast (gray, thick gauge). The gray box highlights the time surrounding the fee schedule introduction.



Assessing the Impact of the Introduction of a Fixed-Value Physician Fee Schedule

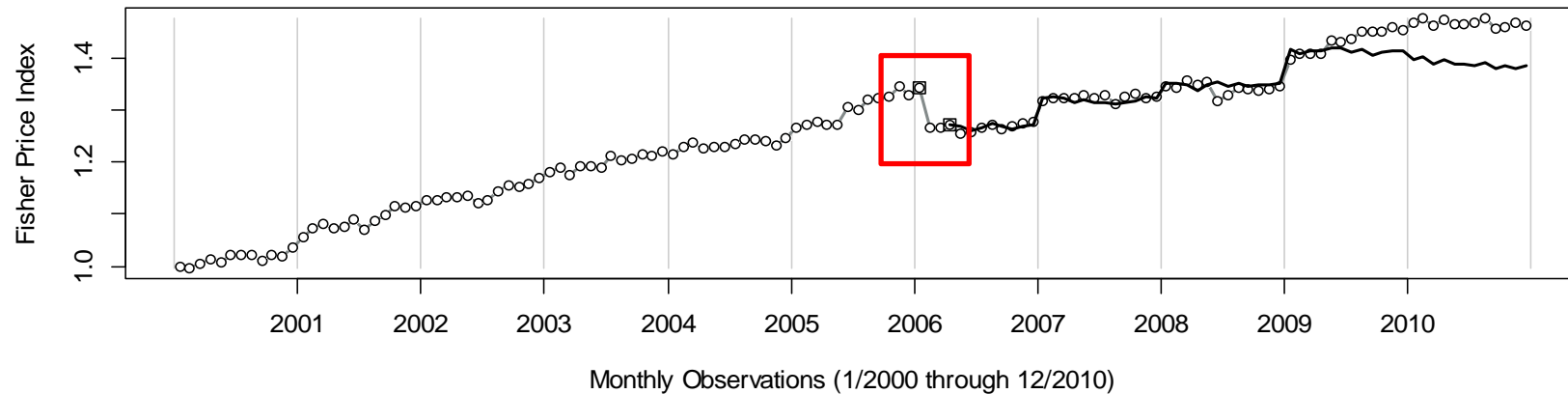
Short-Term Impacts

Illinois



Illinois

Price Indexes and Price Departure, All Categories



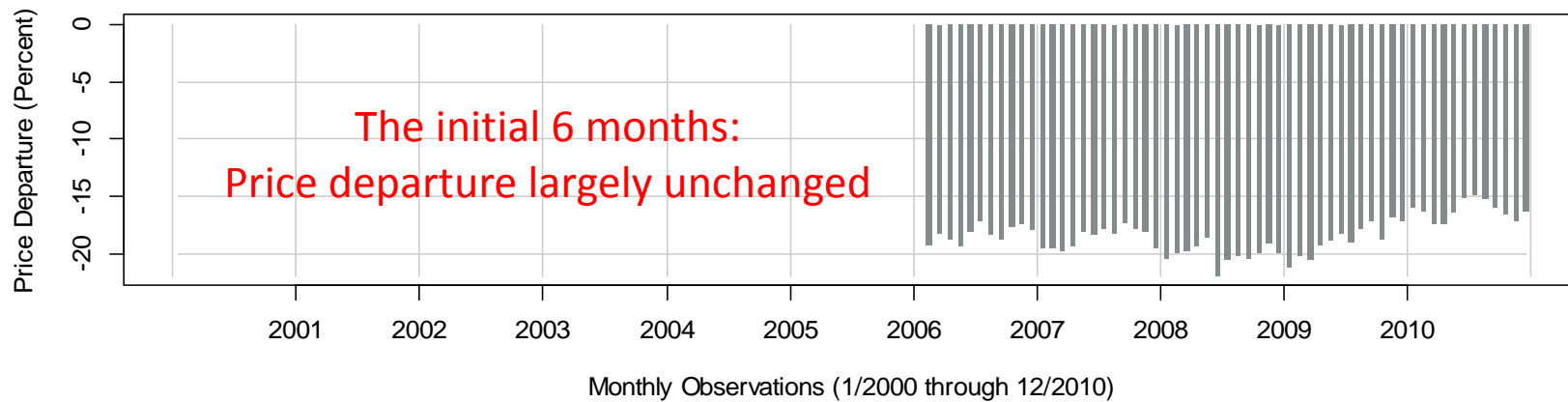
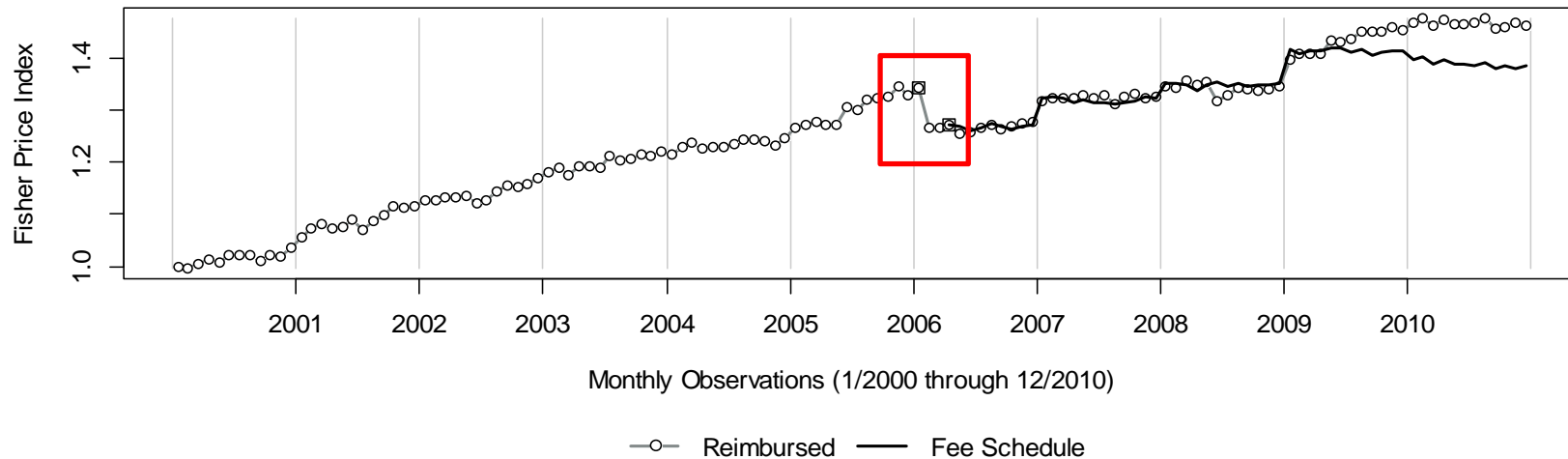
The initial impact:
Prices fall

Price indexes are shown at reimbursed amounts and at fee schedule. The price index at reimbursed amounts comprises all CPT codes, regardless of their fee schedule treatment. Price departure is the relative deviation of reimbursed amounts from MAR. The price departure computation is based on all CPT codes, implicitly assuming no price departure for CPT codes that are not subject to a fixed-value MAR.

Price indexes change only if prices change. Price departure, on the other hand, may change without prices changing. The price index at fee schedule starts in the third post-implementation month, which is April 2006.

Illinois

Price Indexes and Price Departure, All Categories

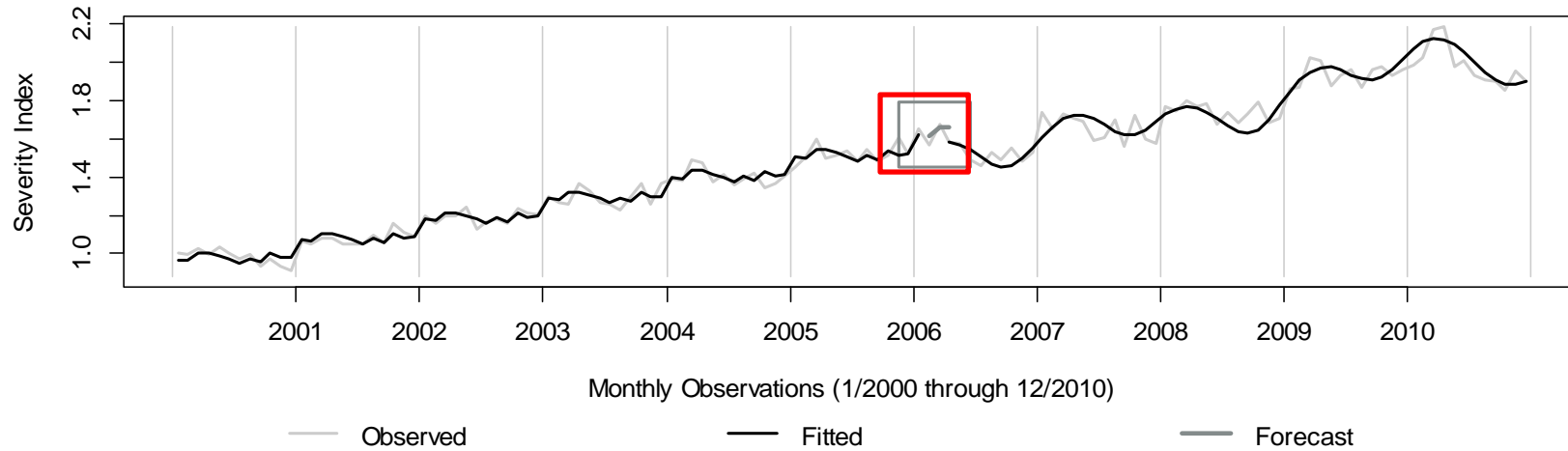


Price indexes are shown at reimbursed amounts and at fee schedule. The price index at reimbursed amounts comprises all CPT codes, regardless of their fee schedule treatment. Price departure is the relative deviation of reimbursed amounts from MAR. The price departure computation is based on all CPT codes, implicitly assuming no price departure for CPT codes that are not subject to a fixed-value MAR.

Price indexes change only if prices change. Price departure, on the other hand, may change without prices changing. The price index at fee schedule starts in the third post-implementation month, which is April 2006.

Illinois

Severity and Utilization Responses, All Categories

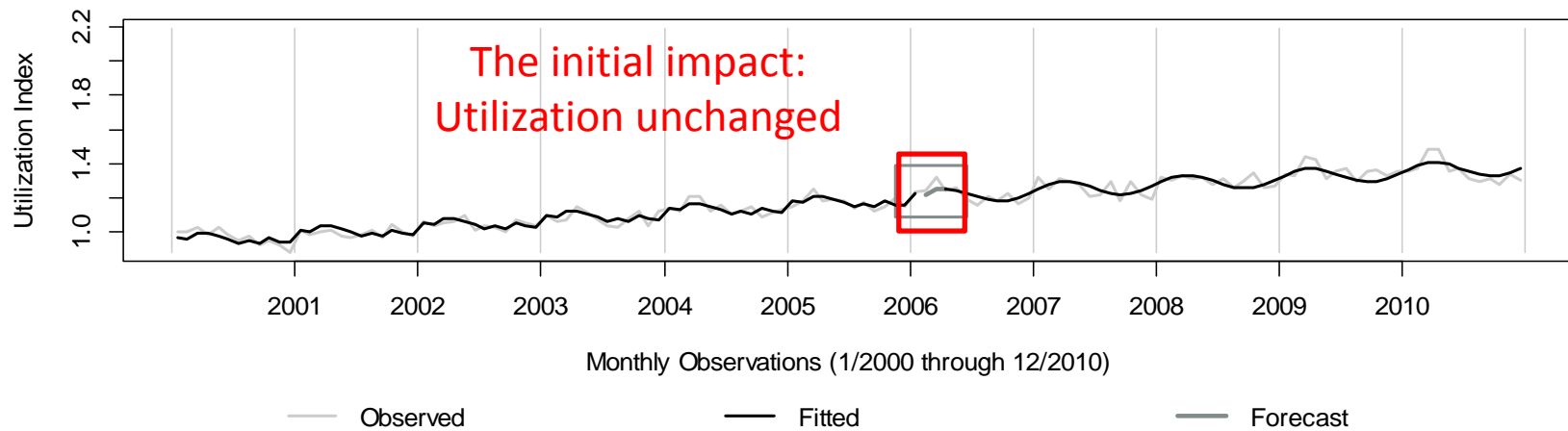
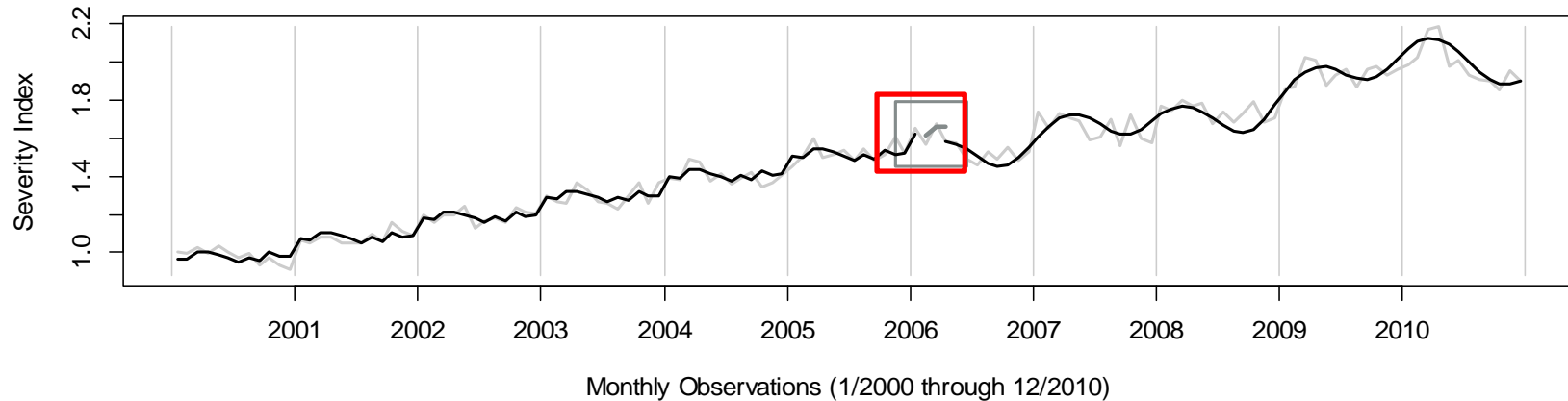


The initial impact:
Severity falls

The severity index is the product of the Fisher price index and the utilization index. The utilization index equals the Fisher quantity index, normalized by the number of active claims. In this context, a claim is considered active (in a given service category or overall) if there was a transaction (in a given service category or, when overall, in any given service category) associated with this claim included in the price index for the month. The Fisher price and quantity indexes are computed at reimbursed amounts and comprise all CPT codes. The indexes in the top panel are shown as observed (gray, thin gauge), as predicted (black), and as forecast (gray, thick gauge). The gray box highlights the time surrounding the fee schedule introduction.

Illinois

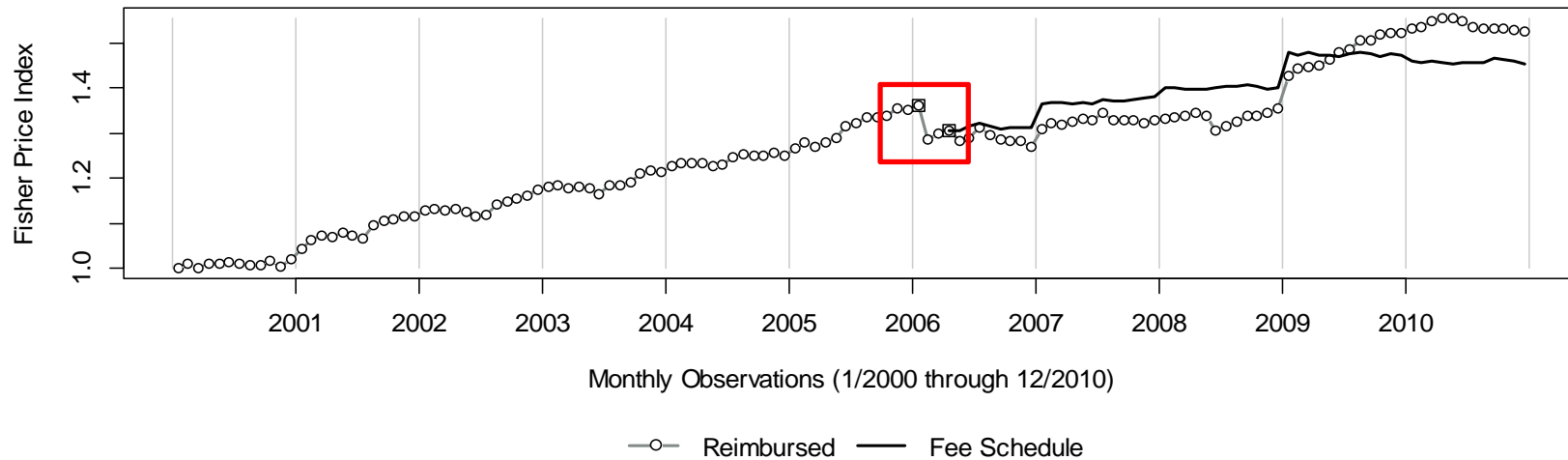
Severity and Utilization Responses, All Categories



The severity index is the product of the Fisher price index and the utilization index. The utilization index equals the Fisher quantity index, normalized by the number of active claims. In this context, a claim is considered active (in a given service category or overall) if there was a transaction (in a given service category or, when overall, in any given service category) associated with this claim included in the price index for the month. The Fisher price and quantity indexes are computed at reimbursed amounts and comprise all CPT codes. The indexes in the top panel are shown as observed (gray, thin gauge), as predicted (black), and as forecast (gray, thick gauge). The gray box highlights the time surrounding the fee schedule introduction.

Illinois

Price Indexes and Price Departure, Physical Medicine



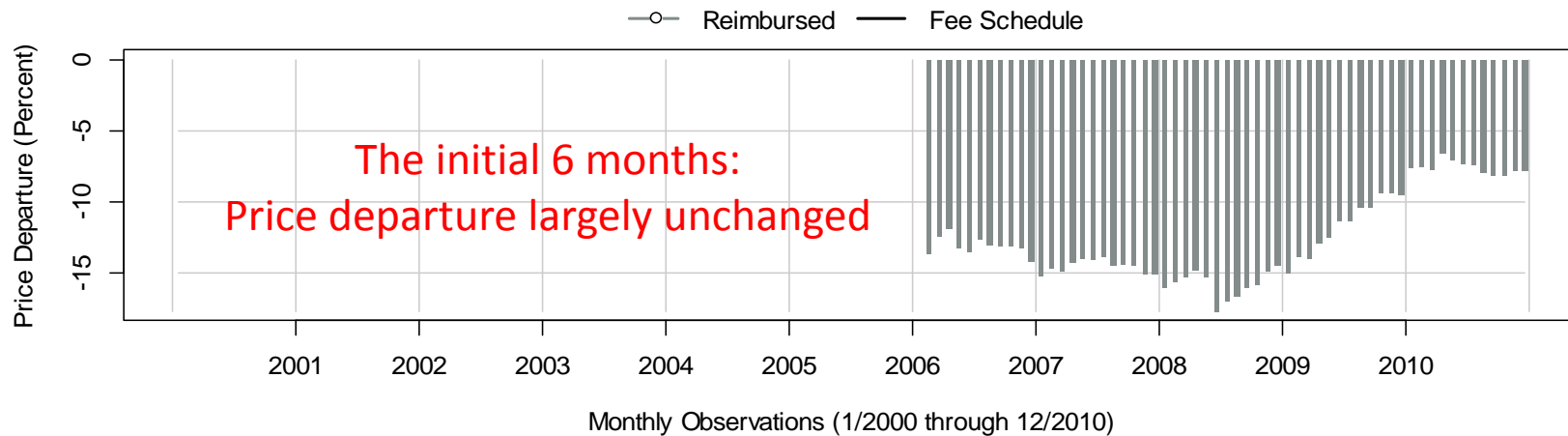
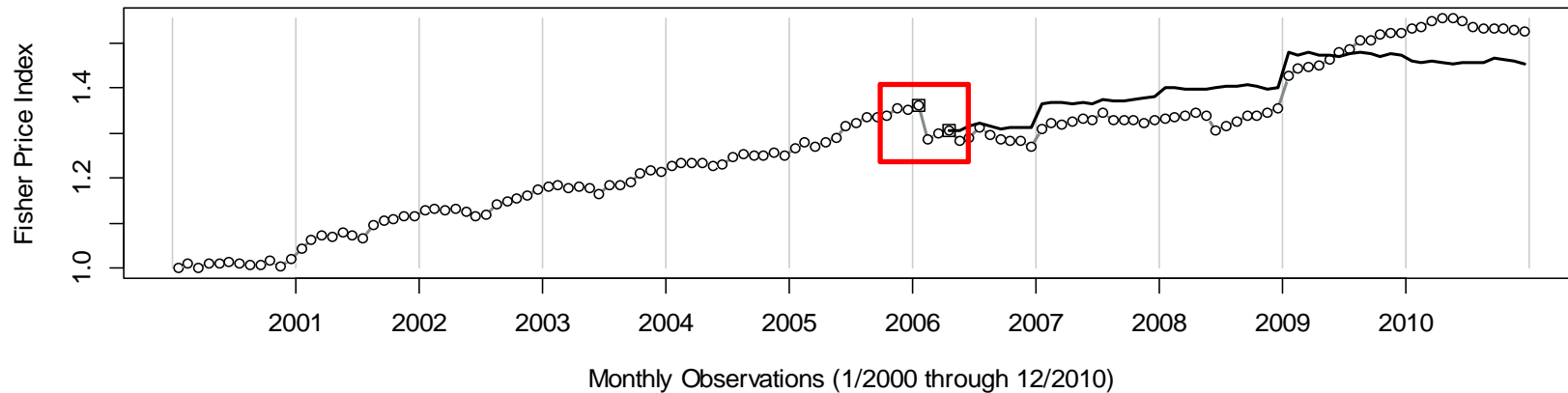
The initial impact:
Prices fall

Price indexes are shown at reimbursed amounts and at fee schedule. The price index at reimbursed amounts comprises all CPT codes, regardless of their fee schedule treatment. Price departure is the relative deviation of reimbursed amounts from MAR. The price departure computation is based on all CPT codes, implicitly assuming no price departure for CPT codes that are not subject to a fixed-value MAR.

Price indexes change only if prices change. Price departure, on the other hand, may change without prices changing. The price index at fee schedule starts in the third post-implementation month, which is April 2006.

Illinois

Price Indexes and Price Departure, Physical Medicine

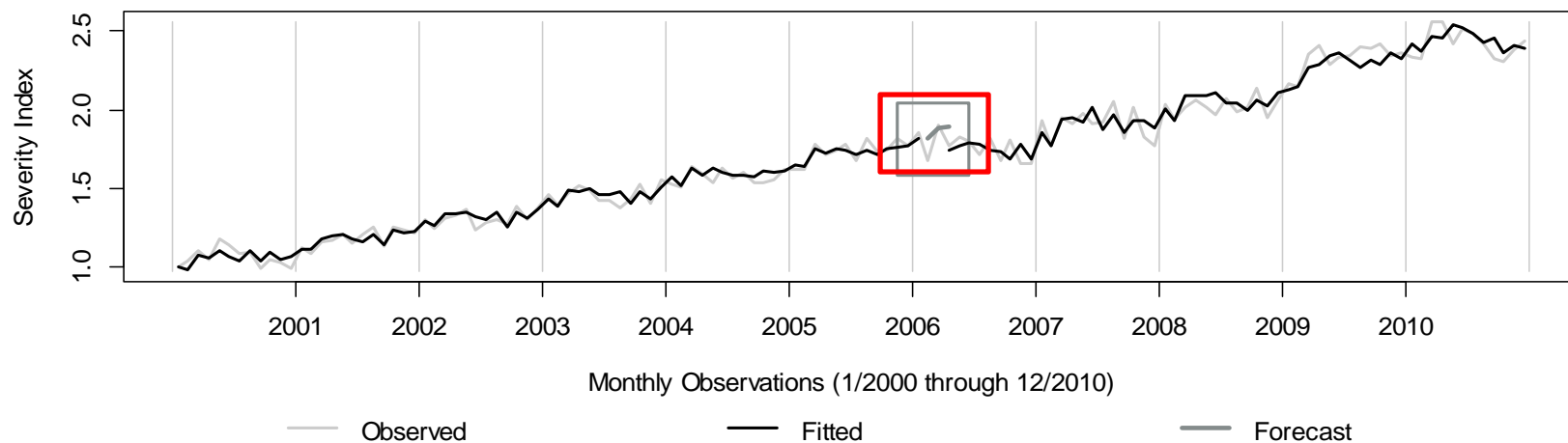


Price indexes are shown at reimbursed amounts and at fee schedule. The price index at reimbursed amounts comprises all CPT codes, regardless of their fee schedule treatment. Price departure is the relative deviation of reimbursed amounts from MAR. The price departure computation is based on all CPT codes, implicitly assuming no price departure for CPT codes that are not subject to a fixed-value MAR.

Price indexes change only if prices change. Price departure, on the other hand, may change without prices changing. The price index at fee schedule starts in the third post-implementation month, which is April 2006.

Illinois

Severity and Utilization Responses, Physical Medicine

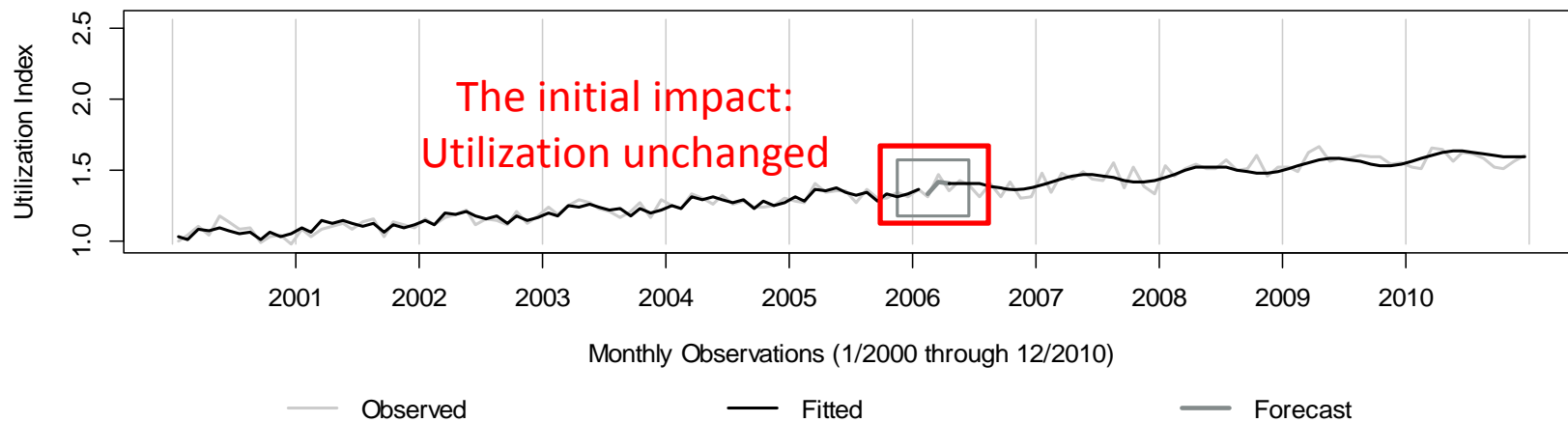
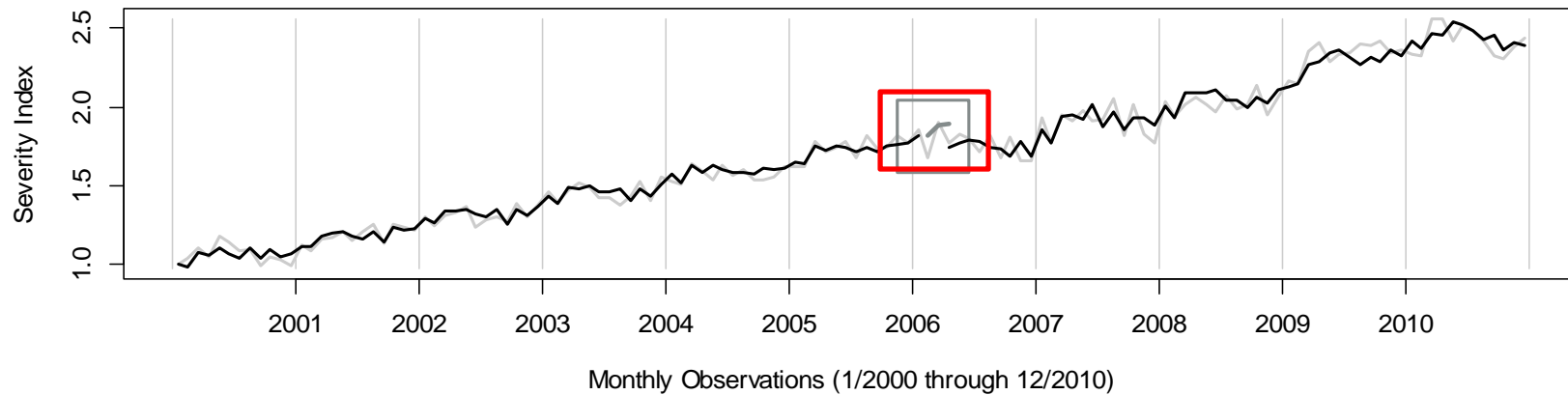


The initial impact:
Severity down

The severity index is the product of the Fisher price index and the utilization index. The utilization index equals the Fisher quantity index, normalized by the number of active claims. In this context, a claim is considered active (in a given service category or overall) if there was a transaction (in a given service category or, when overall, in any given service category) associated with this claim included in the price index for the month. The Fisher price and quantity indexes are computed at reimbursed amounts and comprise all CPT codes. The indexes in the top panel are shown as observed (gray, thin gauge), as predicted (black), and as forecast (gray, thick gauge). The gray box highlights the time surrounding the fee schedule introduction.

Illinois

Severity and Utilization Responses, Physical Medicine



The severity index is the product of the Fisher price index and the utilization index. The utilization index equals the Fisher quantity index, normalized by the number of active claims. In this context, a claim is considered active (in a given service category or overall) if there was a transaction (in a given service category or, when overall, in any given service category) associated with this claim included in the price index for the month. The Fisher price and quantity indexes are computed at reimbursed amounts and comprise all CPT codes. The indexes in the top panel are shown as observed (gray, thin gauge), as predicted (black), and as forecast (gray, thick gauge). The gray box highlights the time surrounding the fee schedule introduction.

Understanding the Price Level Response

Why would average price paid fall when a fee schedule is imposed?

- The actual amounts paid for a particular service in a given month typically vary
 - Indeed, they often are concentrated around two or more common values
- Even where the price ceiling imposed by a newly introduced fee schedule exceeds the average reimbursed amount for a given medical service, for the top percentiles of the distribution, the price ceiling constitutes a binding constraint
 - By means of capping the top percentiles at the fixed-value MAR, the fee schedule lowers the average reimbursed amount, all else being equal
- From this perspective, the introduction of a fee schedule is expected to reduce the average reimbursement for a given medical service or, more broadly, the price index at reimbursed amounts of a given service category
 - But then, in Evaluation and Management Services, the price index at reimbursed amounts increased

Understanding the Price Level Response Anchoring

Why might average price paid increase when a fee schedule is imposed?

- A possible explanation of the atypical response of the price level for Evaluation and Management Services may be found in the behavioral concept of anchoring
 - This behavioral idea suggests that an individual's judgment about the value of object or service often is drawn toward a number that, in effect, serves as reference—sometimes subconsciously
 - As argued by Kahneman, Ritov, and Schkade, 1999, "anchoring effects are among the most robust observations in the psychological literature"
 - These authors identify two "necessary and apparently sufficient conditions for the emergence of anchoring effects"
 - One condition is "the presence of some uncertainty about the correct or appropriate response"
 - The other condition is "a procedure that causes the individual to consider a number as a candidate answer"
- In the context of physician fee schedules, the introduction of a MAR, actually an upper limit, may serve as a reference point in determining the desired or appropriate reimbursement

Understanding the Price Level Response Anchoring

- The impact of the MAR capping the upper percentiles of the distribution of reimbursed amounts is to reduce its mean, all else being equal
- If the MAR also serves as an anchor for individual providers or payers in determining an appropriate price, the distribution of actual prices will move toward the MAR, thereby increasing the mean of this distribution
- The net effect of these two opposing forces determines whether the average reimbursement for a given medical service increases in response to a fee schedule introduction



Understanding the Price Level Response Anchoring

- In order to get a “leading indicator” of the potential impact of fee schedule prices a hypothetical pre-implementation price departure was also computed
- This was based on the ratio of total observed payments in the month prior to implementation to the value of payments on the same transactions if they had been made at the initial future fee schedule prices



Understanding the Price Level Response Anchoring

- When compared to All Categories, the indicated pre-introduction price departure in Evaluation and Management Services was extensive, measuring a negative 21.1%
- This large differential between the center of the pre-implementation distribution of reimbursed amounts and the newly introduced fixed-value MAR may have enhanced the anchoring effect



Short-Term Effect on Price Changes

How Initial Prices Might Influence Post-Implementation Prices

	discount = 15.00%				
	% change (inflation)				
	Initial Price	Fee Price	Price @ discount	Fee vs. Initial Price	Discount vs. initial price
service c	\$100.00	\$110.00	\$93.50	10.0%	-6.5%
service b	\$90.00	\$95.00	\$80.75	5.6%	-10.3%
service d	\$90.00	\$90.00	\$76.50	0.0%	-15.0%
service e	\$90.00	\$85.00	\$72.25	-5.6%	-19.7%
service a	\$80.00	\$110.00	\$93.50	37.5%	16.9%
	\$450.00	\$490.00	\$416.50	8.9%	-7.4%

The large difference between the average pre-implementation price paid and the fixed-value MAR for “service a” results in an increase in the actual negotiated price at the indicated 15% discount from MAR.

For Tennessee, the pre-implementation time window runs from January 2000 through June 2005. The post-implementation time window starts in September 2005 and ends in December 2010. For Illinois, the pre-implementation time intervals covers January 2000 through January 2006. The post-implementation time window begins in April 2006 and concludes in December 2010.



Short-Term Effect on Price Departures

Severity, Price, Utilization, and Price Departures: Third Month Post-Implementation vs. Last Month Pre-Implementation

Table 1: Impact of Fee Schedule Introduction, All Categories						
Jurisdiction	Effects			Price Departure		
	(Percent Change)			(Percent)	(Percentage Points)	
	Severity	Price level	Utilization	Pre Introduction	Post Introduction	Difference
Tennessee	-9.3	-7.4	-2.0	-15.7	-23.1	-7.4
Illinois	-4.9	-5.2	0.3	-14.7	-18.7	-4.0

In these two states:

- Severity fell
- Prices paid fell
- Utilization change was mixed
- Price departure increased

For Tennessee, the pre-implementation time window runs from January 2000 through June 2005. The post-implementation time window starts in September 2005 and ends in December 2010. For Illinois, the pre-implementation time intervals covers January 2000 through January 2006. The post-implementation time window begins in April 2006 and concludes in December 2010.





Assessing the Short-Term and Long-Term Impacts of the Introduction of a Fixed-Value Physician Fee Schedule

Long-Term Impacts



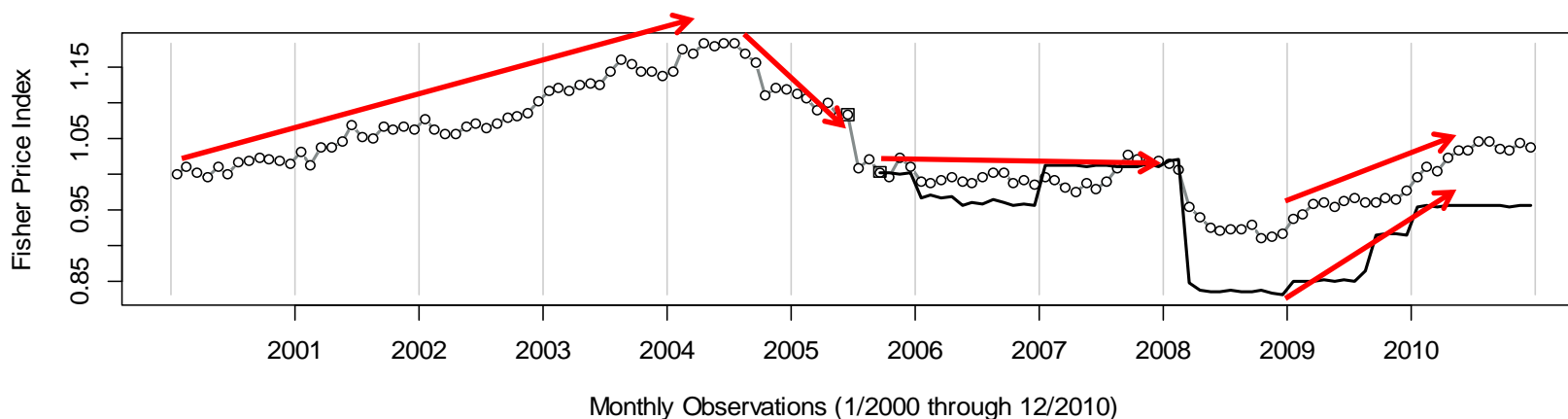
Long-Term Effect

- One might anticipate that the initial, short-term effect of the fee schedule introduction might dissipate over time as providers adjust to the new regulatory environment
- The long-term, permanent effect on medical costs has two key components
 - Lowering the Cost Curve
 - The long-term effect of the fee schedule introduction will depend on whether the initial effect on the price level persists over time (e.g., whether the price departure narrows)
 - Bending the Cost Curve
 - In addition, the long-term effect may also be reflected in a continuing reduction in the rate of inflation (compared to the rate that would be observed otherwise)
 - Typically, the rate of inflation would extend from the lower price level established as part of the short-term effect



Tennessee

Price Indexes and Price Departure, All Categories

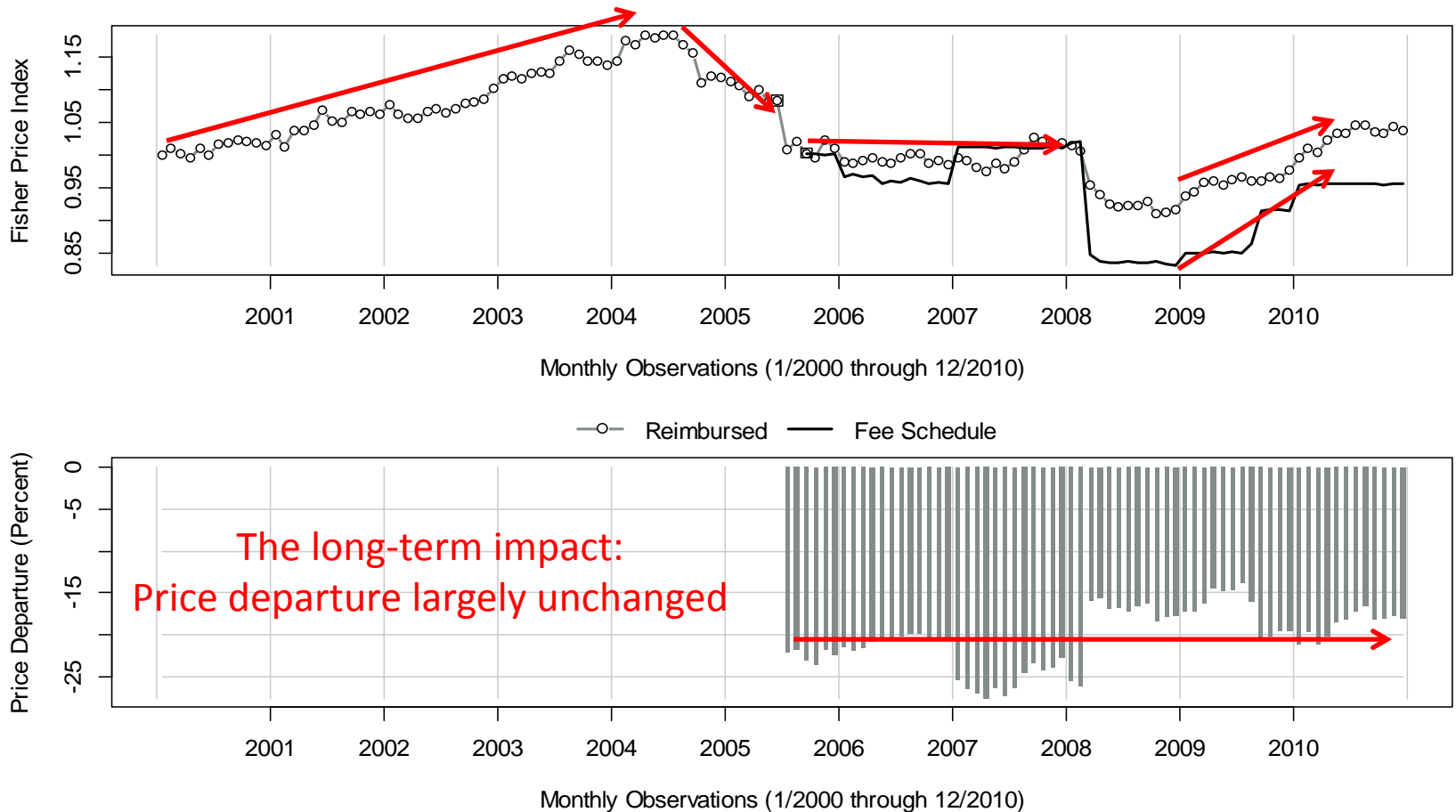


The long-term impact:
Price decline permanent
Inflation constrained; tracks the fee schedule

Price indexes are shown at reimbursed amounts and at fee schedule. The price index at reimbursed amounts comprises all CPT codes, regardless of their fee schedule treatment. Price departure is the relative deviation of reimbursed amounts from MAR. The price departure computation is based on all CPT codes, implicitly assuming no price departure for CPT codes that are not subject to a fixed-value MAR. Price indexes change only if prices change. Price departure, on the other hand, may change without prices changing. The price index at fee schedule starts in the third post-implementation month, which is September 2005.

Tennessee

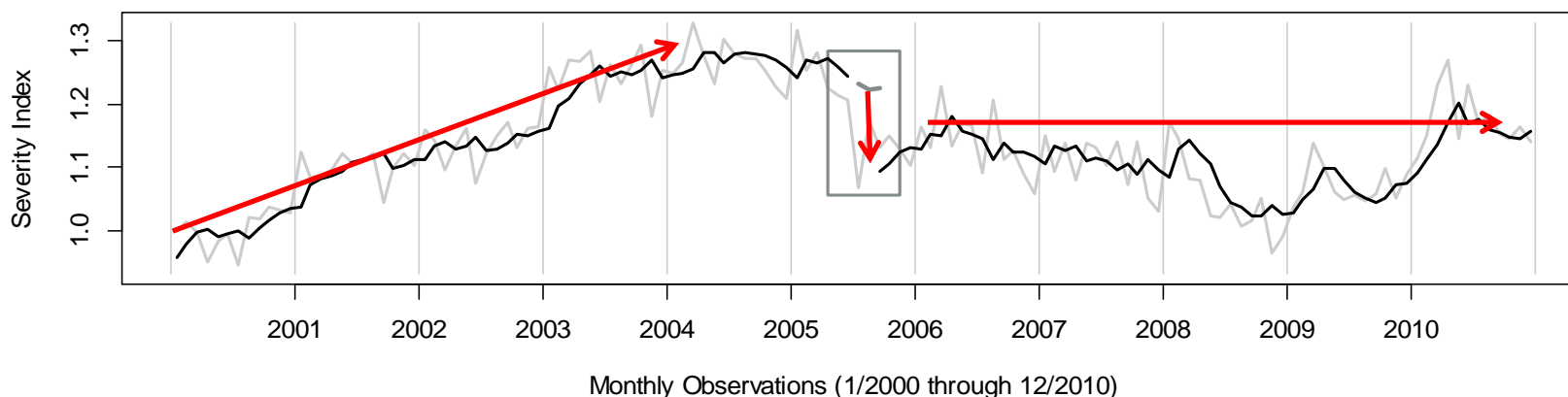
Price Indexes and Price Departure, All Categories



Price indexes are shown at reimbursed amounts and at fee schedule. The price index at reimbursed amounts comprises all CPT codes, regardless of their fee schedule treatment. Price departure is the relative deviation of reimbursed amounts from MAR. The price departure computation is based on all CPT codes, implicitly assuming no price departure for CPT codes that are not subject to a fixed-value MAR. Price indexes change only if prices change. Price departure, on the other hand, may change without prices changing. The price index at fee schedule starts in the third post-implementation month, which is September 2005.

Tennessee

Severity and Utilization Responses, All Categories



The long-term impact:
Severity decline permanent
Severity constrained; tracks the fee schedule

— Observed

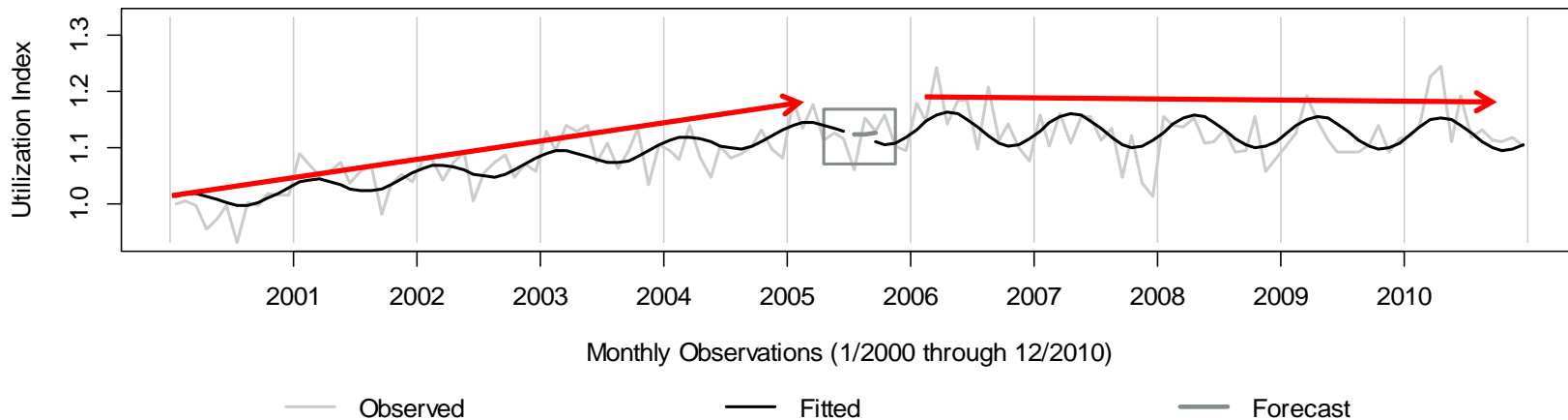
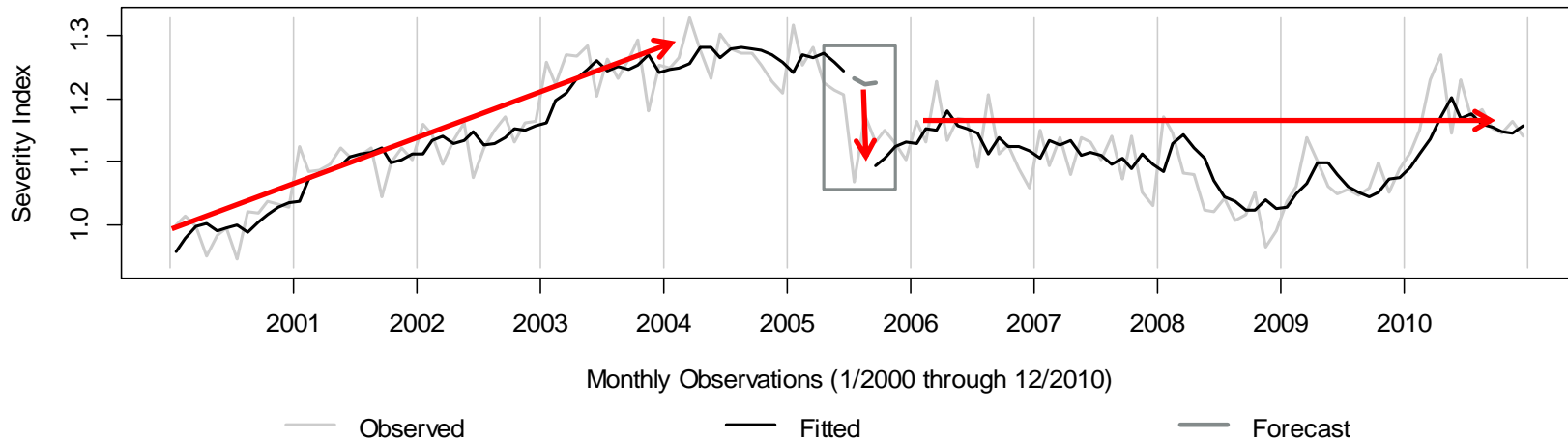
— Fitted

— Forecast

The severity index is the product of the Fisher price index and the utilization index. The utilization index equals the Fisher quantity index, normalized by the number of active claims. In this context, a claim is considered active (in a given service category or overall) if there was a transaction (in a given service category or, when overall, in any given service category) associated with this claim included in the price index for the month. The Fisher price and quantity indexes are computed at reimbursed amounts and comprise all CPT codes. The indexes in the top panel are shown as observed (gray, thin gauge), as predicted (black), and as forecast (gray, thick gauge). The gray box highlights the time surrounding the fee schedule introduction.

Tennessee

Severity and Utilization Responses, All Categories

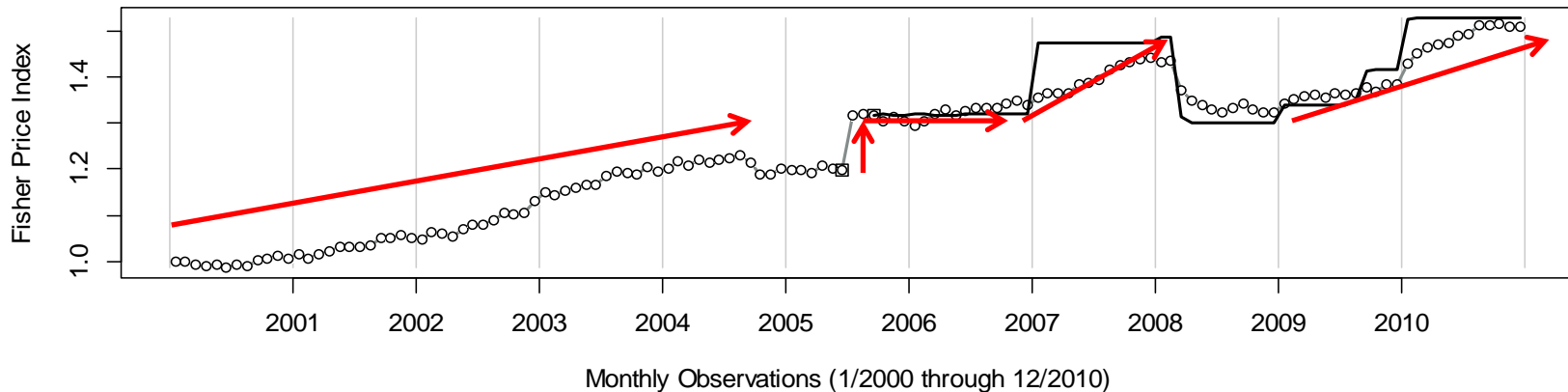


**The long-term impact:
Utilization remained unchanged**

The severity index is the product of the Fisher price index and the utilization index. The utilization index equals the Fisher quantity index, normalized by the number of active claims. In this context, a claim is considered active (in a given service category or overall) if there was a transaction (in a given service category or, when overall, in any given service category) associated with this claim included in the price index for the month. The Fisher price and quantity indexes are computed at reimbursed amounts and comprise all CPT codes. The indexes in the top panel are shown as observed (gray, thin gauge), as predicted (black), and as forecast (gray, thick gauge). The gray box highlights the time surrounding the fee schedule introduction.

Tennessee

Price Indexes and Price Departure, Evaluation and Management Services



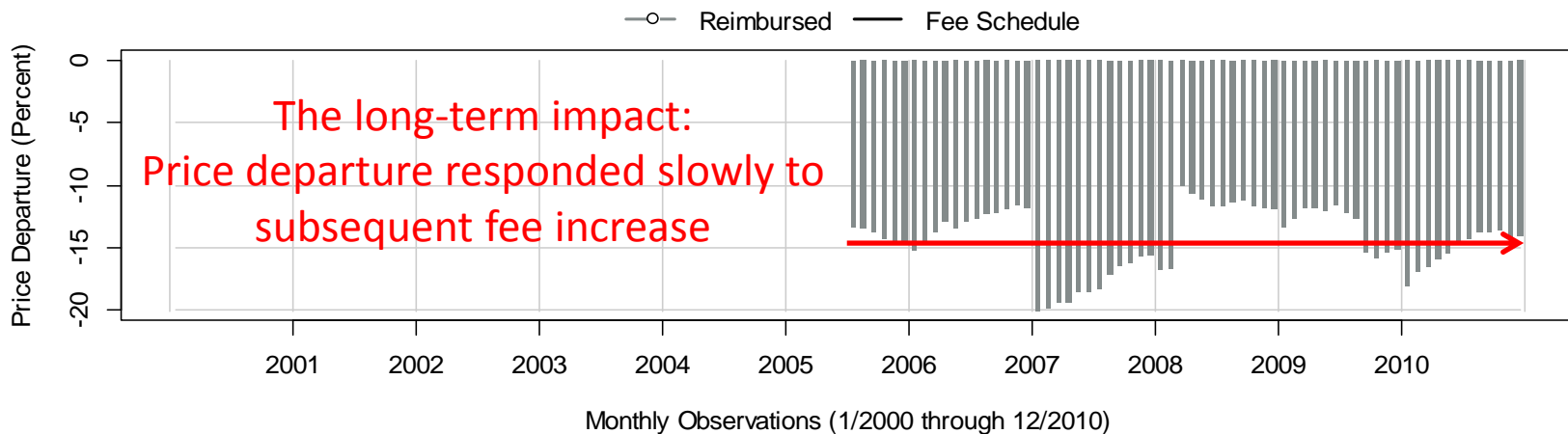
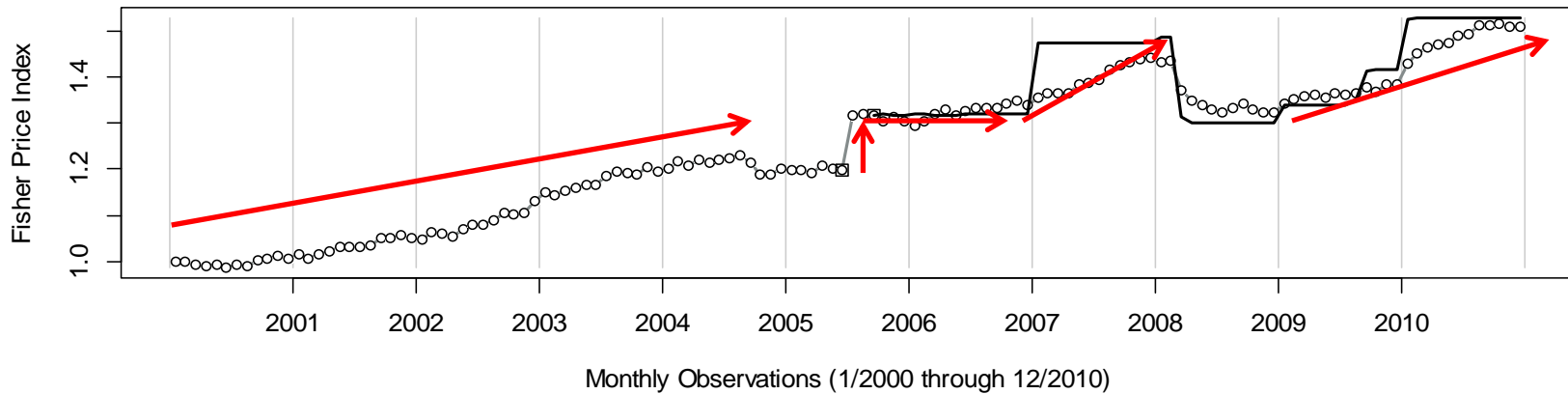
The long-term impact:
Initial price increase held
Price inflation tracks the fee schedule

Price indexes are shown at reimbursed amounts and at fee schedule. The price index at reimbursed amounts comprises all CPT codes, regardless of their fee schedule treatment. Price departure is the relative deviation of reimbursed amounts from MAR. The price departure computation is based on all CPT codes, implicitly assuming no price departure for CPT codes that are not subject to a fixed-value MAR.

Price indexes change only if prices change. Price departure, on the other hand, may change without prices changing. The price index at fee schedule starts in the third post-implementation month, which is September 2005.

Tennessee

Price Indexes and Price Departure, Evaluation and Management Services

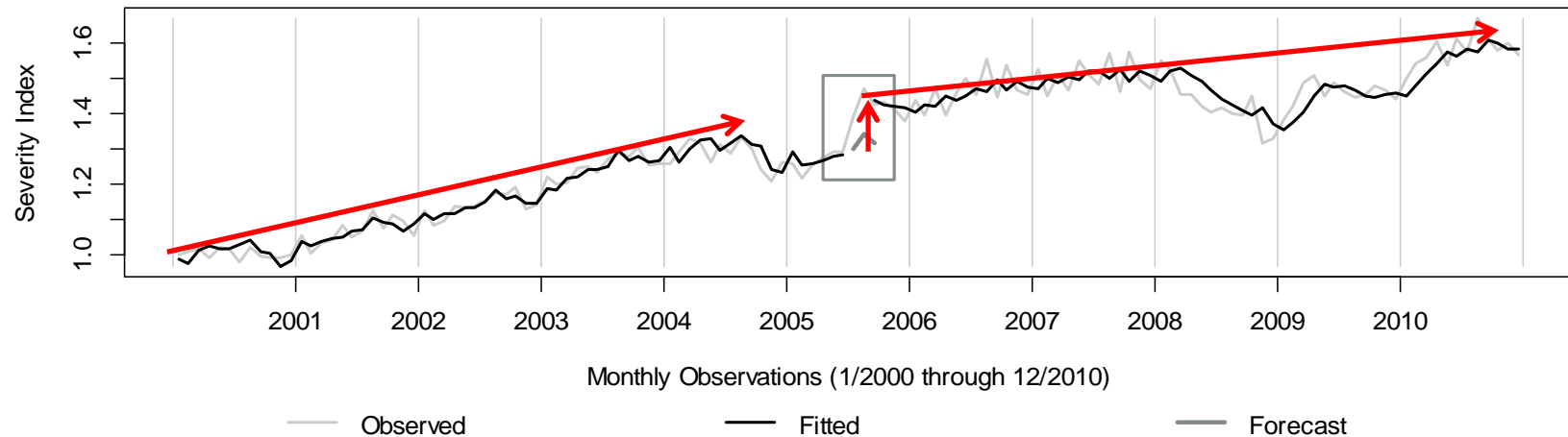


Price indexes are shown at reimbursed amounts and at fee schedule. The price index at reimbursed amounts comprises all CPT codes, regardless of their fee schedule treatment. Price departure is the relative deviation of reimbursed amounts from MAR. The price departure computation is based on all CPT codes, implicitly assuming no price departure for CPT codes that are not subject to a fixed-value MAR.

Price indexes change only if prices change. Price departure, on the other hand, may change without prices changing. The price index at fee schedule starts in the third post-implementation month, which is September 2005.

Tennessee

Severity and Utilization Responses, Evaluation and Management Services

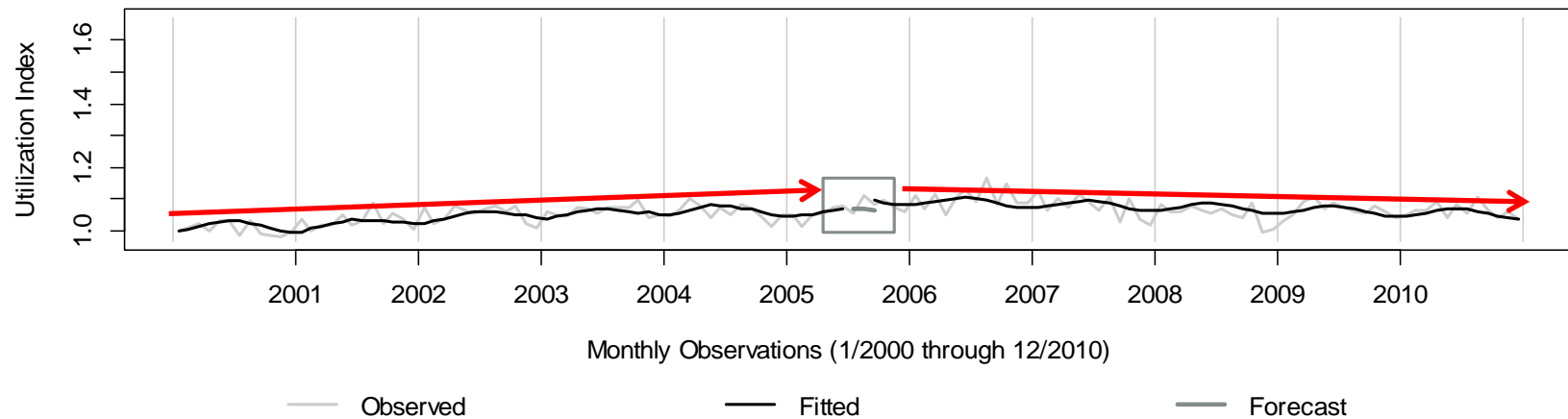
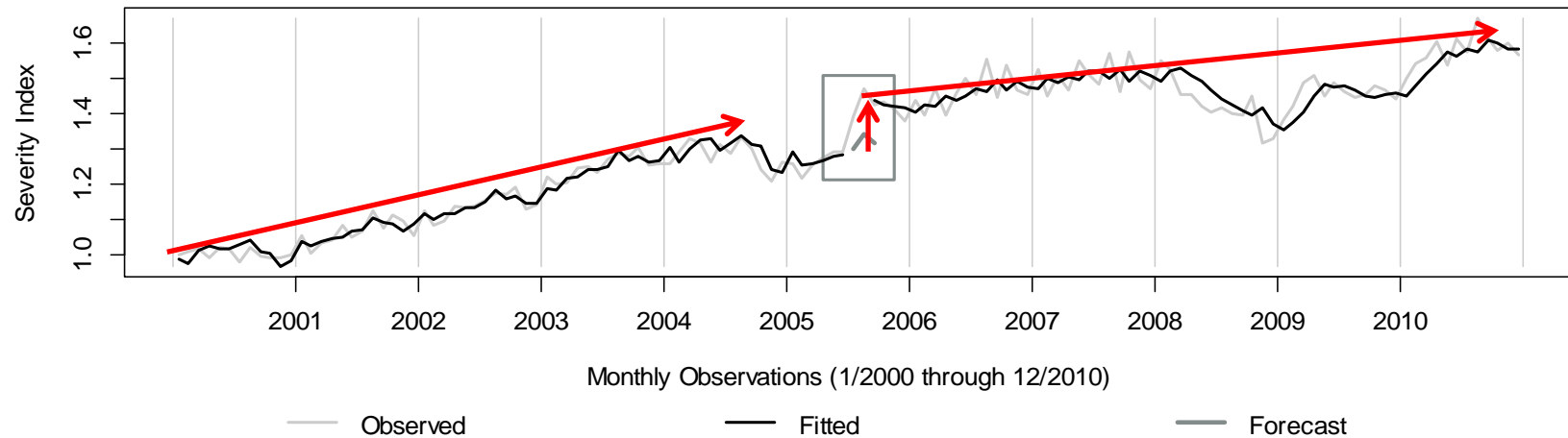


The long-term impact:
Severity increase permanent
Severity largely tracks the fee schedule

The severity index is the product of the Fisher price index and the utilization index. The utilization index equals the Fisher quantity index, normalized by the number of active claims. In this context, a claim is considered active (in a given service category or overall) if there was a transaction (in a given service category or, when overall, in any given service category) associated with this claim included in the price index for the month. The Fisher price and quantity indexes are computed at reimbursed amounts and comprise all CPT codes. The indexes in the top panel are shown as observed (gray, thin gauge), as predicted (black), and as forecast (gray, thick gauge). The gray box highlights the time surrounding the fee schedule introduction.

Tennessee

Severity and Utilization Responses, Evaluation and Management Services

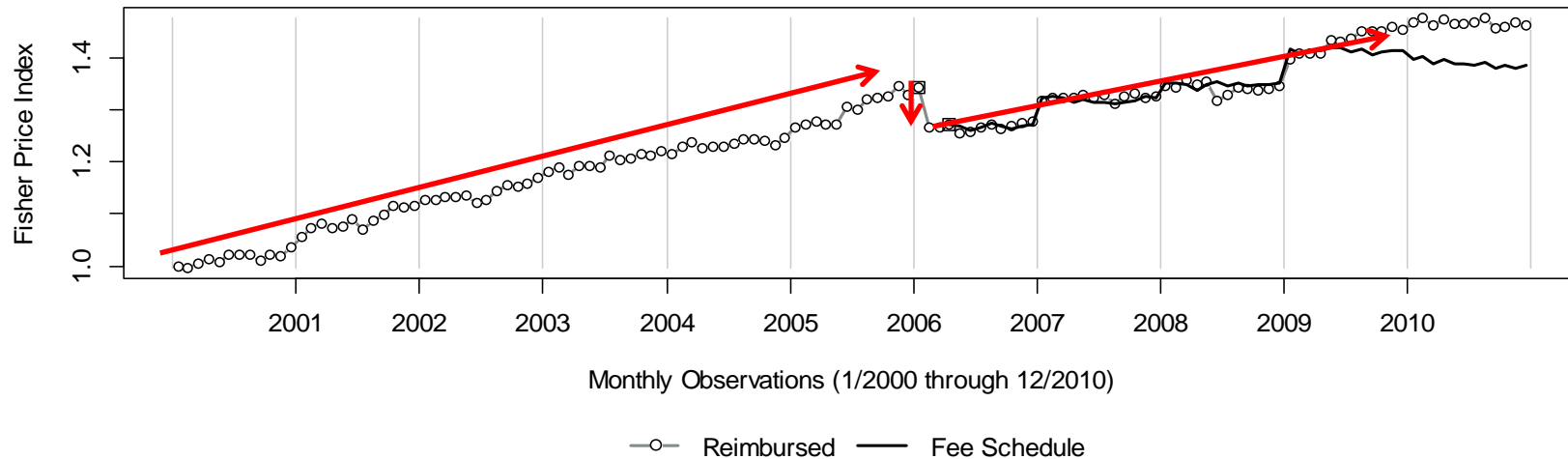


**The long-term impact:
Utilization declined slightly**

The severity index is the product of the Fisher price index and the utilization index. The utilization index equals the Fisher quantity index, normalized by the number of active claims. In this context, a claim is considered active (in a given service category or overall) if there was a transaction (in a given service category or, when overall, in any given service category) associated with this claim included in the price index for the month. The Fisher price and quantity indexes are computed at reimbursed amounts and comprise all CPT codes. The indexes in the top panel are shown as observed (gray, thin gauge), as predicted (black), and as forecast (gray, thick gauge). The gray box highlights the time surrounding the fee schedule introduction.

Illinois

Price Indexes and Price Departure, All Categories



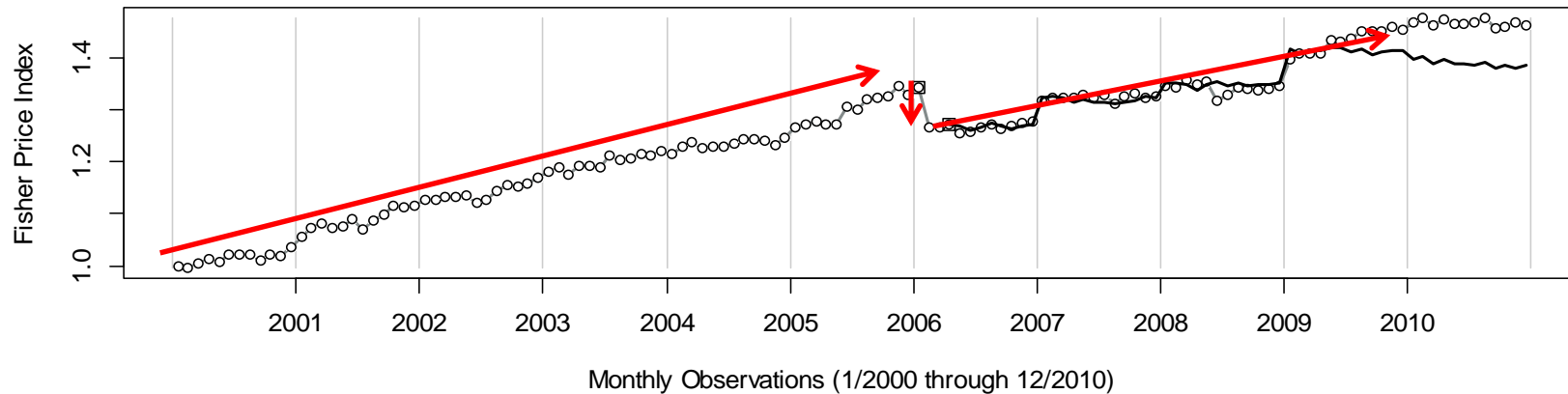
**The long-term impact:
Price decline permanent
Inflation largely tracks the fee schedule until 2009**

Price indexes are shown at reimbursed amounts and at fee schedule. The price index at reimbursed amounts comprises all CPT codes, regardless of their fee schedule treatment. Price departure is the relative deviation of reimbursed amounts from MAR. The price departure computation is based on all CPT codes, implicitly assuming no price departure for CPT codes that are not subject to a fixed-value MAR.

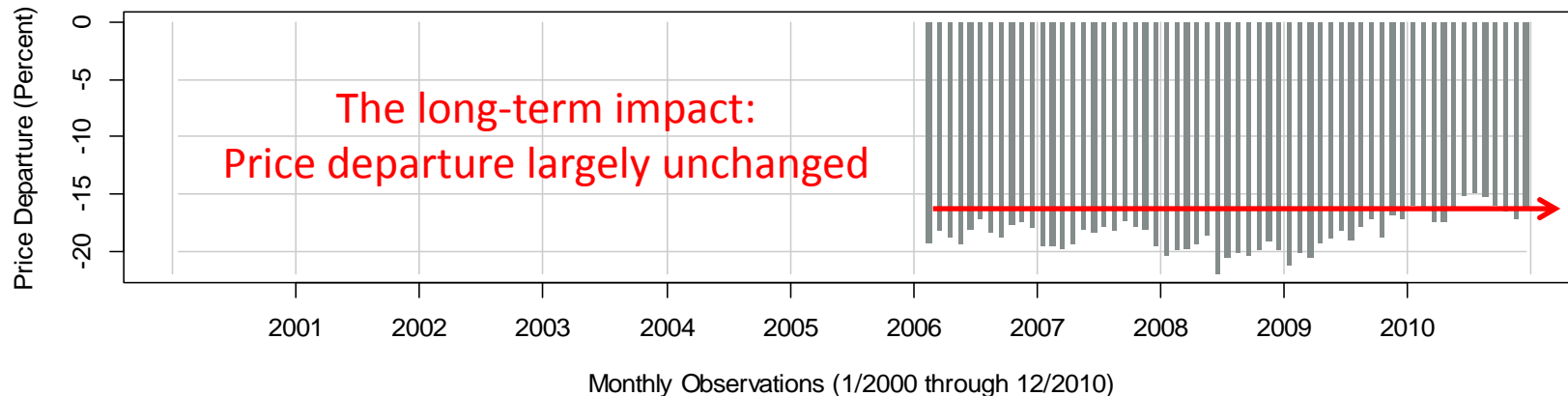
Price indexes change only if prices change. Price departure, on the other hand, may change without prices changing. The price index at fee schedule starts in the third post-implementation month, which is April 2006.

Illinois

Price Indexes and Price Departure, All Categories



—○— Reimbursed — Fee Schedule

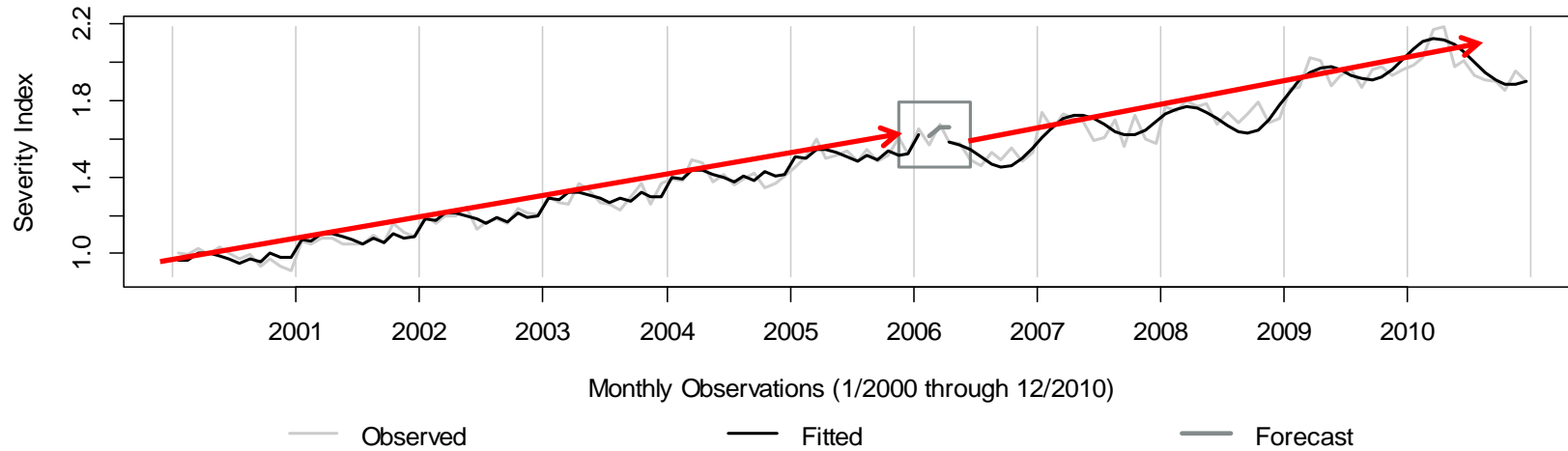


Price indexes are shown at reimbursed amounts and at fee schedule. The price index at reimbursed amounts comprises all CPT codes, regardless of their fee schedule treatment. Price departure is the relative deviation of reimbursed amounts from MAR. The price departure computation is based on all CPT codes, implicitly assuming no price departure for CPT codes that are not subject to a fixed-value MAR.

Price indexes change only if prices change. Price departure, on the other hand, may change without prices changing. The price index at fee schedule starts in the third post-implementation month, which is April 2006.

Illinois

Severity and Utilization Responses, All Categories



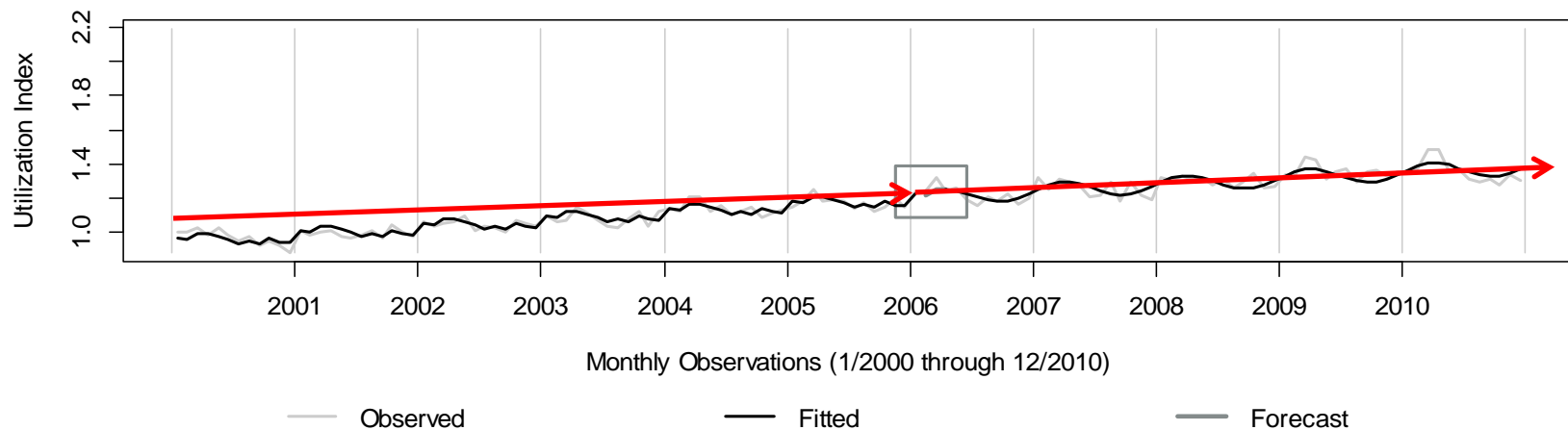
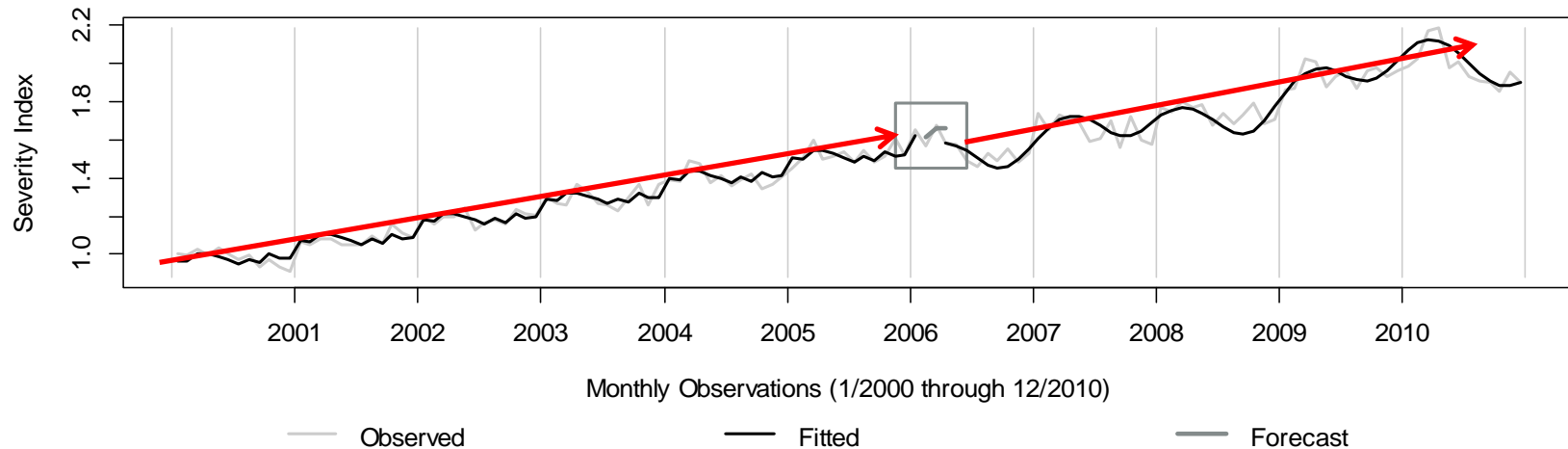
**The long-term impact:
Severity decline modest but permanent
Severity tracks actual prices paid**

Price indexes are shown at reimbursed amounts and at fee schedule. The price index at reimbursed amounts comprises all CPT codes, regardless of their fee schedule treatment. Price departure is the relative deviation of reimbursed amounts from MAR. The price departure computation is based on all CPT codes, implicitly assuming no price departure for CPT codes that are not subject to a fixed-value MAR.

Price indexes change only if prices change. Price departure, on the other hand, may change without prices changing. The price index at fee schedule starts in the third post-implementation month, which is April 2006.

Illinois

Severity and Utilization Responses, All Categories

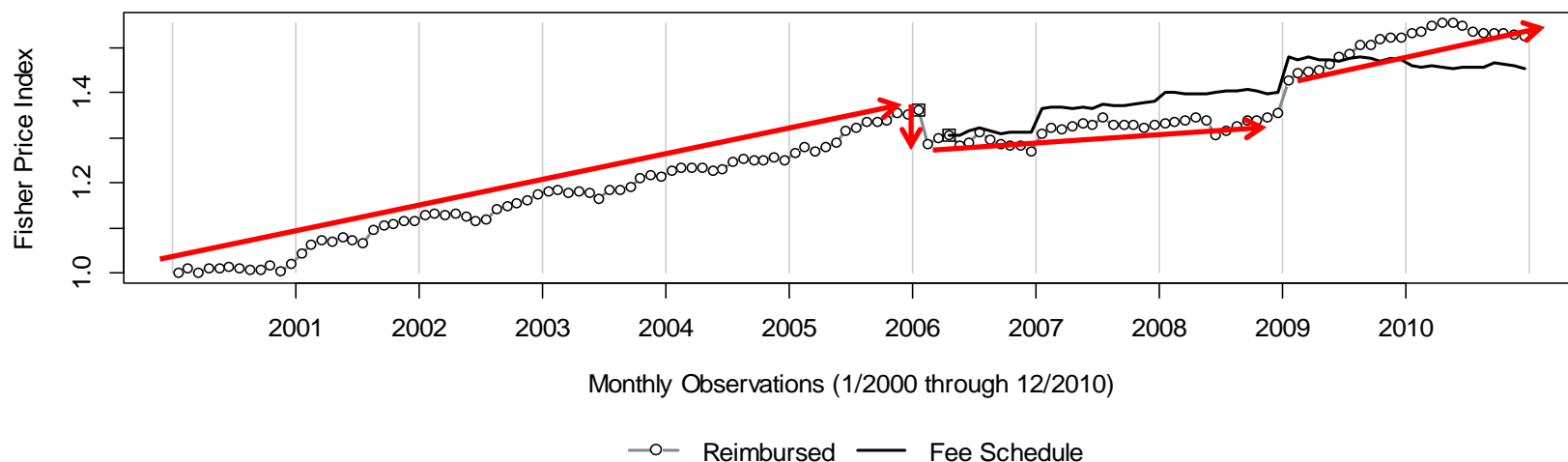


**The long-term impact:
Modest utilization growth continued**

The severity index is the product of the Fisher price index and the utilization index. The utilization index equals the Fisher quantity index, normalized by the number of active claims. In this context, a claim is considered active (in a given service category or overall) if there was a transaction (in a given service category or, when overall, in any given service category) associated with this claim included in the price index for the month. The Fisher price and quantity indexes are computed at reimbursed amounts and comprise all CPT codes. The indexes in the top panel are shown as observed (gray, thin gauge), as predicted (black), and as forecast (gray, thick gauge). The gray box highlights the time surrounding the fee schedule introduction.

Illinois

Price Indexes and Price Departure, Physical Medicine



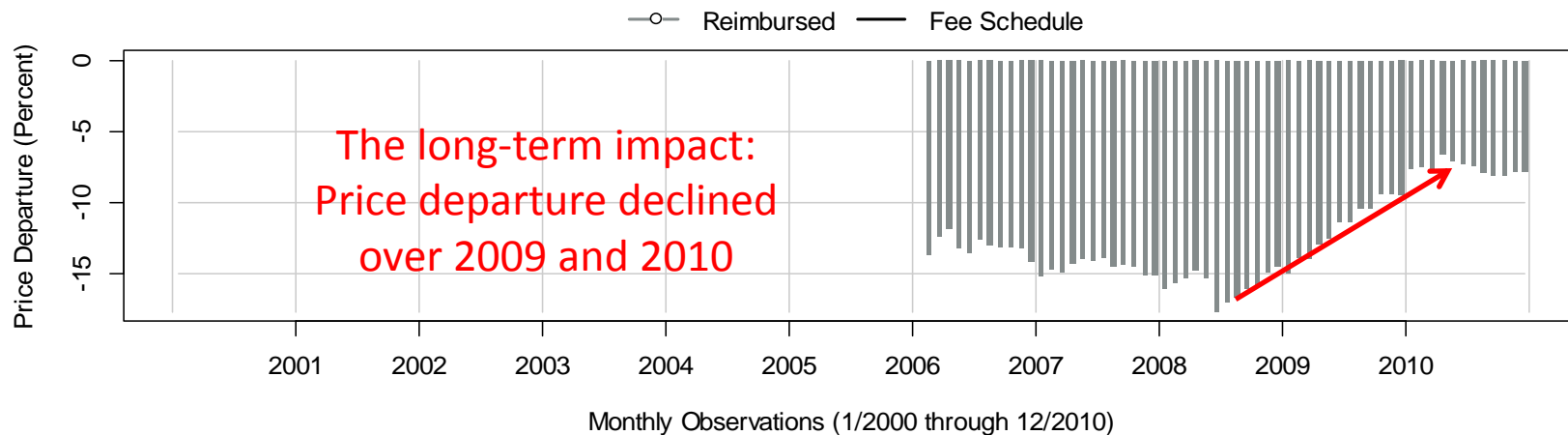
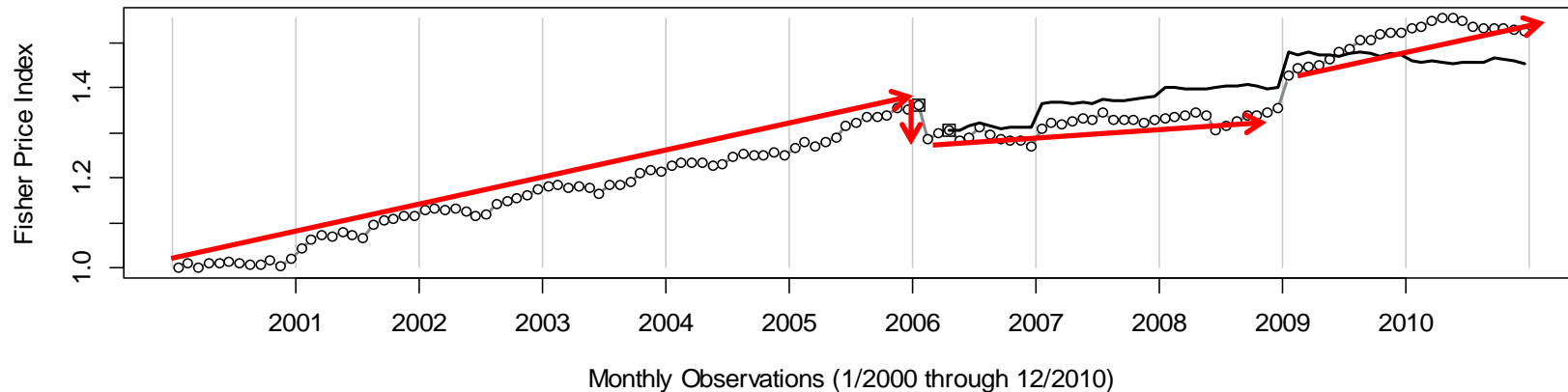
**The long-term impact:
Modest initial price decline permanent
Inflation largely tracks the fee schedule until 2009**

Price indexes are shown at reimbursed amounts and at fee schedule. The price index at reimbursed amounts comprises all CPT codes, regardless of their fee schedule treatment. Price departure is the relative deviation of reimbursed amounts from MAR. The price departure computation is based on all CPT codes, implicitly assuming no price departure for CPT codes that are not subject to a fixed-value MAR.

Price indexes change only if prices change. Price departure, on the other hand, may change without prices changing. The price index at fee schedule starts in the third post-implementation month, which is April 2006.

Illinois

Price Indexes and Price Departure, Physical Medicine

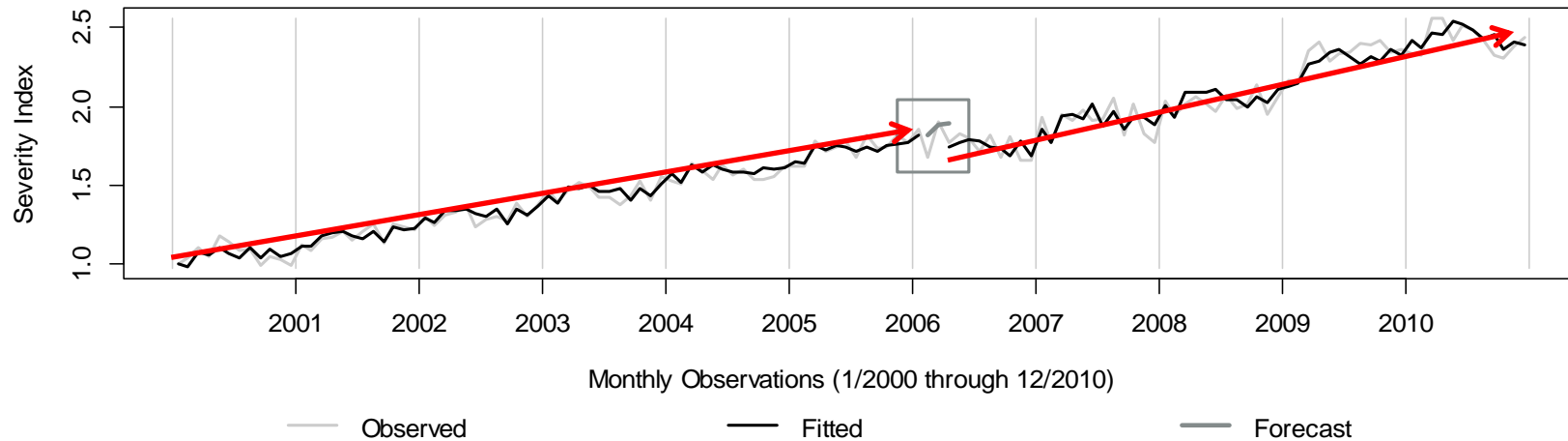


Price indexes are shown at reimbursed amounts and at fee schedule. The price index at reimbursed amounts comprises all CPT codes, regardless of their fee schedule treatment. Price departure is the relative deviation of reimbursed amounts from MAR. The price departure computation is based on all CPT codes, implicitly assuming no price departure for CPT codes that are not subject to a fixed-value MAR.

Price indexes change only if prices change. Price departure, on the other hand, may change without prices changing. The price index at fee schedule starts in the third post-implementation month, which is April 2006.

Illinois

Severity and Utilization Responses, Physical Medicine

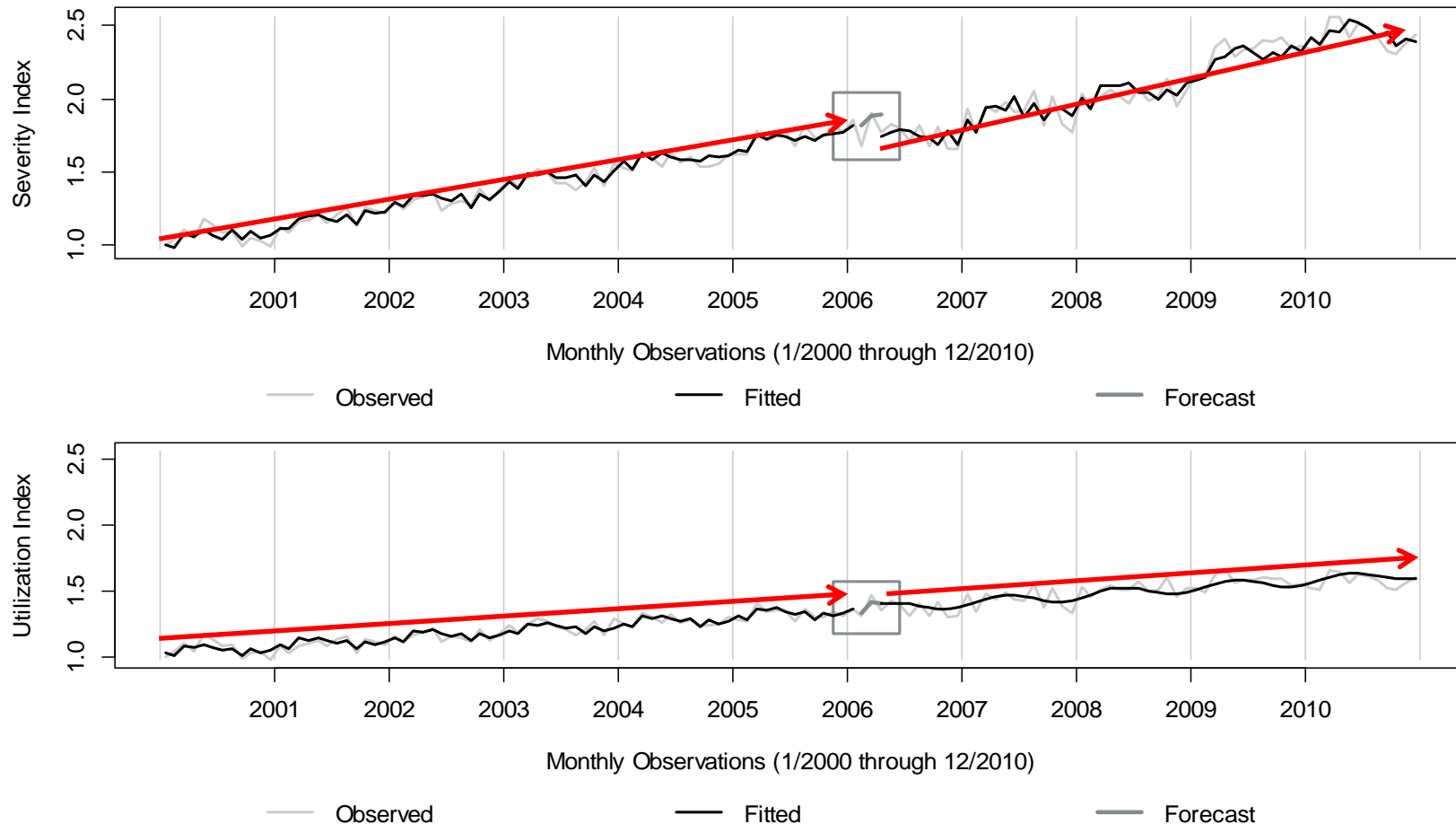


The long-term impact:
Severity decline modest but permanent
Severity growth slightly higher post reform

The severity index is the product of the Fisher price index and the utilization index. The utilization index equals the Fisher quantity index, normalized by the number of active claims. In this context, a claim is considered active (in a given service category or overall) if there was a transaction (in a given service category or, when overall, in any given service category) associated with this claim included in the price index for the month. The Fisher price and quantity indexes are computed at reimbursed amounts and comprise all CPT codes. The indexes in the top panel are shown as observed (gray, thin gauge), as predicted (black), and as forecast (gray, thick gauge). The gray box highlights the time surrounding the fee schedule introduction.

Illinois

Severity and Utilization Responses, Physical Medicine



**The long-term impact:
Modest utilization growth continued**

The severity index is the product of the Fisher price index and the utilization index. The utilization index equals the Fisher quantity index, normalized by the number of active claims. In this context, a claim is considered active (in a given service category or overall) if there was a transaction (in a given service category or, when overall, in any given service category) associated with this claim included in the price index for the month. The Fisher price and quantity indexes are computed at reimbursed amounts and comprise all CPT codes. The indexes in the top panel are shown as observed (gray, thin gauge), as predicted (black), and as forecast (gray, thick gauge). The gray box highlights the time surrounding the fee schedule introduction.

Long-Term Effect on Workers Compensation Medical Inflation

Inflation Rates: Post-Implementation vs. Pre-Implementation

Jurisdiction	Fisher Price Index at Reimbursed Amounts (Percent Increase)		Regional M-CPI (Percent Increase)		Difference in Differences (Percentage Points)
	Before	After	Before	After	
Tennessee	1.5	0.6	4.0	3.5	-0.3
Illinois	5.0	3.0	4.8	3.4	-0.6

Not only did the rate of workers compensation medical inflation in these two states fall during the recession period that followed the introduction of MAR-based medical fee schedules, the declines were greater than the declines in medical inflation generally.

For Tennessee, the pre-implementation time window runs from January 2000 through June 2005. The post-implementation time window starts in September 2005 and ends in December 2010. For Illinois, the pre-implementation time intervals cover January 2000 through January 2006. The post-implementation time window begins in April 2006 and concludes in December 2010.



Long-Term Effect of Fee Schedules

Evidence from Earlier Studies

- Price Departures—Workers Compensation vs. Group Health:
 - Robertson and Corro, 2007, compare workers compensation to Group Health and show that in jurisdictions without a fee schedule, medical prices in workers compensation tend to have a higher markup over Group Health
- Cross-State Differences in Medical Prices Paid:
 - Yang and Fomenko, 2012, in comparing 25 jurisdictions for the first half of 2011, demonstrate that the six non-fee schedule jurisdictions are among the seven states with the highest price level for nonhospital, nonfacility medical services delivered in the context of workers compensation
 - Illinois is the only fee schedule jurisdiction that ranks with the set of non-fee schedule states
- Cross-State Differences in the Rate of Medical Price Inflation:
 - Yang and Fomenko also show that among the 25 studied jurisdictions, the six non-fee schedule states are among the jurisdictions with a higher than average rate of inflation for workers compensation-related nonhospital, nonfacility services for the time period 2002 through (the first half of) 2011



Evaluation of Fee Schedule Introductions

The fact that no material change in utilization was observed indicates that decision makers may focus on the price level impact.

Based on the analysis of these two states:

- Where the pre-implementation price departure was in the neighborhood of -15% ...
- The introduction of the fixed-value MAR fee schedules resulted in a decline in the price level between 5% and 10%

Conclusion

Based on an Analysis of Tennessee and Illinois

- The fee schedule introductions contributed to a marked decline in the price level of medical services provided by physicians, as well as a permanent weakening of the subsequent inflation rate of this price level
- No systematic and significant utilization effect was identified
- As a consequence, both the level and the growth in (contemporaneous) medical severity were reduced



Conclusion

Based on an Analysis of the Introduction of Fixed-Value MAR Physician Fee Schedules in Tennessee and Illinois

It is worth noting, however, that for Evaluation and Management Services in Tennessee, the price level increased in response to the introduction of the fixed-value MAR.

- The introduction of the firm upper limit would have been expected to reduce the average price by capping the top end of the payments distribution
- The observed increase may be intentional and/or may reflect an anchoring effect that would have caused the lower part of the distribution to shift toward the MAR
- Although this study provides no direct evidence to support this anchoring effect, it is a concept to bear in mind when contemplating the impact of changes in fee schedules





Questions?

Comments?

