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## Program Report

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## Program on Health Care

Jonathan Gruber\*

The NBER's Program on Health Care was founded in 1990 and led by its inaugural program director, Alan Garber, from 1990 until 2009. Under Alan's leadership the program grew rapidly; I have the privilege of succeeding him. The Program's researchers have expanded the boundaries of the field by asking exciting new questions, incorporating cutting edge empirical techniques, and finding new and innovative data sets to study. Interest in the work of this Program has increased enormously over the past three years, in particular as a result of the ongoing debate over the Affordable Care Act (ACA) which was passed in March 2010 and represents the most significant reform of our health care system since the introduction of Medicare and Medicaid in the mid-1960s.

While it is impossible to summarize the enormous amount of work that has been undertaken by Health Care Program researchers, this report provides an overview of research in several of the most active areas of the Program over the past five years.

### Insurance Plan Choices

One of the most exciting developments in the Health Care Program has been the mix of theoretical and empirical strategies brought to bear on understanding insurance plan choices by individuals. Much of this work has been led by Amy Finkelstein, Liran Einav, and their collaborators. In one paper (14414), the authors use new data from a large private employer to develop and implement a test of the importance of adverse selection in employer-provided health insurance coverage (whereby the sick choose the most generous health insurance plans), finding that such selection does not appear to cause large welfare losses. In two subsequent papers (15241, 16723), they develop general techniques for test-

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\*Gruber directs the NBER's Program on Health Care and is a professor of economics at MIT. The numbers in parentheses throughout this report refer to NBER Working Papers.

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ing insurance market theories. And, in more recent work (16969, 17802), they extend their framework to consider additional questions. Is the selection of a health insurance plan driven by the individual's understanding of how much more care he or she will use when enrolled in more generous insurance? (Yes.) Do individuals consider the implications of their current utilization for future health insurance prices that they might face? (To a modest extent, but not fully.) Additional research by Benjamin Handel (17459) shows that individuals are highly inertial in their health plan choice, and that this may be a key reason for the low welfare costs of adverse selection practice.

One important feature of recent health care reforms is an increased reliance on consumer choice of a health care plan. A number of studies have focused on the new prescription drug plan, Medicare Part D, which when introduced in 2006 allowed elders a choice of a wide range of insurance options. Initial work on this program by Florian Heiss, Daniel McFadden, and Joachim Winter (13627) showed that elders were largely making appropriate choices about whether or not to sign up for the voluntary Part D program, but also suggested that elders might not be choosing the right plan for their drug needs. My research with Jason Abaluck (14759) uses data on actual plan choices by Part D enrollees to show that enrollees are overweighting premium costs relative to the out-of-pocket costs that they incur for drugs under their Part D plans. As a result, the typical senior could have saved about 30 percent by choosing a more appropriate Part D plan. Jeffrey Kling and others (17410) confirm this when they show that providing elders with information about which drug plans would best reduce their overall out-of-pocket costs significantly affects plan choice.

Several other studies show the important effects of search frictions and failures on insurance markets. NBER researchers James Rebitzer and Lowell Taylor and their coauthors (14455) show that the enormous search costs in the non-group health insurance market lead to significant price dispersion and welfare losses. Likewise, Nicole Maestas, Mathis Schroeder, and Dana Goldman (14679) find wide price dispersion in the market for a homogeneous good, Medigap insurance, which suggests that search fails to impose efficiency on the market. This issue is not confined to the United States:

Richard Frank and Karine Lamiraud (13817) find very broad dispersion in prices for similar insurance products sold on Swiss insurance exchanges.

Other studies have demonstrated the problems posed by imperfect risk adjustment in insurance markets. Kate Bundorf, Jonathan Levin, and Neale Mahoney (14153) show that a lack of risk rating of employee contributions in employer-sponsored insurance leads to significant welfare losses. However, they still estimate that welfare is higher under such circumstances than when there are no choices across insurance plans. This suggests that the welfare losses from choice could be mitigated by better risk adjustment mechanisms. Yet research by Mark Duggan, Illyana Kuziemko, and coauthors (16977) on attempts to risk-adjust for plan choice in the Medicare Advantage program (which offers private insurance alternatives to the government run Medicare program) suggests that these changes have actually *cost* the government money, because insurers have skewed their enrollments towards those groups that are relatively favored by the risk adjustment scheme. Taken together, these studies suggest caution in relying on unfettered choice to generate efficient outcomes in insurance markets.

## Health Production

A second major area of research for our program, as well as the NBER Health Economics Program, has been the production of health itself, which depends on a wide variety of factors both inside and outside the health care sector. Researchers have been incredibly innovative in searching for the factors that might matter for health production and in developing convincing empirical techniques for testing their importance.

Much of this work overlaps with the Health Economics Program led by Michael Grossman, and was reviewed by him several years ago in the Reporter. In particular, there is extensive work on one of the most important public health problems in the United States and around the world, obesity. This area was reviewed

recently by Christopher Ruhm (16149), while John Cawley and Chad Meyerhoefer (16467) estimate that the costs of treating obesity-related illness account for one-sixth of total U.S. health care spending. There is also extensive research on the determinants and health consequences of risky behaviors, a topic reviewed recently by Cawley and Ruhm (17081).

A large number of articles explore the broader determinants of health. Some discuss the importance of health care in determining mortality, including work by David Card, Carlos Dobkin, and Maestas (13668) who show that becoming eligible for Medicare at age 65 significantly reduces mortality for hospital emergency admissions. Other research by Douglas Almond and coauthors (14522) shows that more intensive treatment of newborns whose birth weight falls just below clinical cutoffs leads to reduced infant mortality. A series of articles by Cutler and coauthors (17148, 15678, 14333) shows how factors such as socioeconomic status influence health. Work by Ann Stevens et al. (17657) shows that the fact that mortality rises in economic boom times may be largely because of lower quality workers in medical facilities. And, a pair of studies by William Evans and Timothy Moore (15310, 15311) shows that short-term increases in income tend to increase mortality; for example, mortality decreases before paychecks arrive at the start of the month and increases directly thereafter.

A blossoming area of work in health production is exploring the determinants of health in developing countries, highlighting the important constraints that these poorer populations face for improving their health. For example, Neeraj Sood and coauthors (13649) find that when overall mortality rates are higher, families favor children who are more likely to survive over those who are less likely to live. Anne Case and Christina Paxson (15000) find that regions in Africa that are suffering from the most severe AIDS epidemics also provide the fewest services for newborns. And Seema Jayachandran (14011) shows that wildfires in Indonesia reduced air quality and

led to a substantial increase in infant mortality in that country.

## Health Care Labor Markets

In the health sector, the major source of costs continues to be labor and that is an area of particular interest for researchers in our Program. For example, a pair of studies explored the role of unionization of health care workers: Robert Town and coauthors (17733) compare nursing homes where unions barely win election to others where unions barely lose. They find that in the former case the resulting unionization leads to lower employment with no worse patient outcomes, suggesting a concurrent increase in productivity. Samuel Kleiner and I (15855) find that strikes among unionized nurses have negative implications for patient outcomes, with mortality rising among patients in New York hospitals during nurses' strikes.

Another important issue in this area is the allocation of medical providers across hospitals and patients. Meltzer and Jeanette Chung (16040) discuss the rise of "hospitalists": physicians who specialize in seeing patients only in the hospital setting. They develop and test a model of coordination of care across medical settings describing those situations in which hospitalists would be most advantageous. Joseph Doyle et al. (14174) show that the random allocation of patients across physicians has important implications for patient treatment: patients assigned to physicians who studied at a higher-ranked medical school are treated much more efficiently than those who see physicians from a lower-ranked institution. Guy David and coauthors (16418) find that patients treated by paramedics who are near the end of their shifts spend more time between the accident and the hospital. And Martin Gaynor and coauthors (16077) find that regulations designed to increase the number of nurses per patient in California hospitals have had their intended effect, but did not lead to any improvements in patient outcomes.

## The Economics of Prescription Drugs

Over the past decade, prescription drug costs have risen substantially as a share of total health care spending, and interest in this area has grown with the introduction in 2006 of the Medicare Part D Program. Many papers by Health Care Program researchers have explored interesting questions in the economics of prescription drug utilization, insurance coverage, and market design.

A number of studies in this area have focused on the optimal regulation of prescription drug safety. Tomas Philipson and coauthors (13561, w15603) have noted that drug safety is jointly promoted by regulation, through the Food and Drug Administration, and by the legal system, through drug safety lawsuits. They suggest that such an overlapping system leads to inefficiencies, and they show that a program designed to reduce drug safety lawsuits has led to lower prices for drugs without any increase in adverse drug outcomes. Ellen Meara and coauthors (17426) show that new warning labels that decreased the use of anti-depressants led to worse school performance, increased delinquency, and increased use of illicit substances among depressed teens. And Guy David, Sara Markowitz, and coauthors (14634, 17162) find that increased advertising for prescription drugs increases utilization but also increases the number of adverse outcomes reported to regulators, presumably because of less appropriate use as utilization expands.

Other research in this area has focused specifically on the role of prescription drug insurance coverage for the elderly, which was dramatically expanded under Part D. Darius Lakdawalla and Sood (13501) argue that drug patents are necessary for innovation but lead to underproduction by monopoly pricing drug companies. As a result, the prescription drug coverage provided by Part D can improve welfare by encouraging utilization without lowering prices and the returns to innovation. A number of studies have documented increases in

prescription drug utilization under Part D, but there remains considerable dispute between those that find modest effects (14326) and those that find much larger effects (13917, 16011). Duggan and Fiona Scott-Morton (16011) find that Part D led to dramatic declines in drug prices as a result of larger negotiated price discounts by drug insurers. Gary Engelhardt and I (16155) find that Part D coverage largely served to crowd out existing private insurance coverage for prescriptions among the elderly, with only modest associated reduction in actual out-of-pocket cost exposure.

## Controlling Health Care Costs

The most important long-run fiscal problem facing the United States is the rising cost of health care, which is the largest and single fastest growing element of both Federal and State government spending. But controlling health care costs is a daunting challenge, both because we are still not fully clear on the particular drivers of high and rising health care spending (especially in the United States relative to the rest of the world), and because efforts to control costs might significantly worsen population health. Researchers in the Health Care Program have provided a broad set of insights that can move us towards the goal of controlling costs without dramatically reducing health.

A central question in the cost control debate is how providers should be reimbursed. Phillip DeCicca and coauthors (16909) and Kathleen Mullen, Richard Frank, and Meredith Rosenthal (14886) investigate the particularly popular idea of “pay for performance” through which provider reimbursement is tied to meeting particular quality thresholds. Strikingly, neither study suggests that such incentives have meaningfully affected quality of care. At the same time, Vivian Wu and Yu-Chu Shen (16859) find that reductions in hospital reimbursement by Medicare in the late 1990s led to significant increases in patient mortality. And Doyle et al. (17936) find that patients brought by

ambulance to higher versus lower cost hospitals have significantly improved mortality outcomes.

Another central question for health care is how the market organization of medical providers influences both health care spending and health outcomes. For example, Gaynor, Rodrigo Moreno-Serra, and Carol Propper (16164) study the introduction of hospital competition in the United Kingdom. This was the result of allowing patient choice of hospitals. They find that in areas with greater hospital choice, the introduction of competition led to lower costs and to better patient outcomes. Christopher Afendulis and Daniel Kessler (17316) find that the introduction of high-powered payment incentives is more productive when providers are more highly vertically integrated.

There are comparable questions about the organization of insurance markets. Leemore Dafny (14572) finds that health insurance markets are not perfectly competitive, since she shows that the prices charged for health insurance depend on the purchasing firm’s profitability. On the other hand, Lakdawalla and Wesley Yin (15330) show that the concentration of insurer market power in the Part D prescription drug program, and the associated rise in bargaining leverage with drug manufacturers, leads to significantly lower drug prices to the Part D program. Indeed, in a follow-on paper (16251) they find that the higher market power accruing to private insurers through their Medicare Part D enrollment led to comparable declines in drug prices for those who are privately insured for prescription drugs.

Health Care researchers also have focused on the central issue of technological advances in health care. For example, Cutler (13478) studies the long-run impacts of a particular medical technology, cardiac revascularization, and finds that the procedure has reduced mortality in a cost effective way. On the other hand, Amitabh Chandra and Jonathan Skinner (16953) discuss the broad heterogeneity in the effectiveness of technologies and the inefficiencies associated with “grey

area” treatments with uncertain clinical value, and Skinner and Douglas Staiger (14865) show that unambiguously productive technologies diffuse at very different rates across hospitals. Research by Chandra, Skinner, and Anupam Jena (16990), and by Anriban Basu and Philipson (15633) takes a skeptical look at the potential for “comparative effectiveness research” to slow health care cost growth in the United States, although Basu (16900) argues that such research can have larger effects if it can be individualized to patient needs. An excellent summary of these issues is provided by Garber and Skinner (14257) who catalogue the factors that make U.S. health care particularly inefficient.

### Covering the Uninsured

Finally, the debate over the Affordable Care Act was influenced by, and in turn inspired, many studies about the various policies that might be followed to extend insurance coverage to the 50 million uninsured Americans. A number of studies in this area provided

framing of the broader issues around insurance coverage. I wrote an overview article (13758) which laid out many of the issues faced by policymakers as they try to expand insurance coverage, while Sherry Glied wrote several papers (13881, 13885, 14545) discussing particular policy issues around insurance coverage expansion, such as the source of financing and the role of affordability exemptions under individual mandates. Thomas Buchmueller and Alan Monheit (14839) discuss the central role of employer-sponsored insurance in the U.S. system and whether it should be retained as a feature of system revisions.

A major source of inspiration for the Affordable Care Act was a similar reform enacted in Massachusetts in 2006, and several studies have evaluated the effects of this earlier reform. Jonathan Kolstad and Amanda Kowalski (16012) find that the Massachusetts reform increased preventive care and reduced hospital utilization. Charles Courtemanche and Daniela Zapata (17893) estimate that expanded health insurance coverage in Massachusetts

improved a wide variety of measures of both physical and mental health. I provide an overview of the set of impacts of health reform in Massachusetts and their implications for projecting the effects of the ACA (17168).

Other studies have focused directly on developing evidence on the impact of insurance coverage on medical spending and health. An exciting study by Finkelstein et al. (17190) documents the initial findings from a randomized experiment in Oregon, where individuals were randomly pulled off a waiting list and enrolled in public insurance coverage. This study finds that receiving insurance coverage led to a significant increase in health care utilization, improved self-reported health (particularly mental health), lower measures of financial strain, and higher levels of self-reported well being. Michael Anderson, Dobkin, and Tal Gross (15823) show that young adults aging out of their parents health insurance coverage around age 19 see large reductions in use of both the hospital and the emergency room.



# International Prices and Exchange Rates

Gita Gopinath\*

Milton Friedman advocated flexible exchange rates on the premise that they would allow the relative prices of domestic and foreign goods to adjust in a world with nominal rigidities. The strength of his argument, and its implications for monetary and exchange rate policy, depend crucially on the specifics of nominal rigidity: How rigid are prices? Are prices fixed in the producer's currency or in the local currency? When prices adjust, how much do they respond to exchange rate shocks?

The validity of several of the benchmark models and the main hypothesis in international macroeconomics — such as the Mundell-Fleming models of the 1960s, Dornbusch's overshooting exchange rate hypothesis, and the more recent New Open Economy Macroeconomics literature — also depend on the answers to these questions. In a series of papers, my co-authors and I shed light on these questions by providing evidence for actual traded goods prices. Using micro-data on U.S. import and export prices at-the-dock for the period 1994 to 2009, we develop theoretical models that provide a better fit for the empirical evidence than earlier theoretical environments.

## Nominal and Real Rigidities in Traded Goods Prices

Significant nominal and real rigidities<sup>1</sup> in the pricing of traded goods

are shown in my work with Roberto Rigobon.<sup>2</sup> The median price duration in the currency of pricing is long at 10.6 (12.8) months for U.S. imports (exports). Also, 90 percent (97 percent) of imports (exports) are priced in dollars. In international macro models it is typically assumed that prices are either all rigid in the local currency (importer's currency) or in the producer's currency (exporter's currency), and this assumption is symmetric across countries. In the case of the United States, contrary to this assumption, we find local-currency pricing for imports and producer-currency pricing for exports. This suggests an asymmetry in terms of which country bears the costs/benefits of exchange rate movements. Given the long durations between price adjustment and with most goods prices sticky in dollars, the pass-through of exchange rate shocks into import prices is low in the short run. Interestingly though, even conditioning on a price change, bilateral exchange rate pass-through into U.S. import prices is low, at 22 percent. We further document that differentiated goods manufacturers exhibited marked stability in their trade prices during the Great Trade Collapse of 2008–9, despite the large decline in their trade volumes.<sup>3</sup>

The fact that the vast majority of import prices into the United States are rigid in dollars for a significant duration and that, even conditional on a price change, the response of dollar prices to exchange rate shocks is limited, implies that exchange rate movements produce between zero and small relative price effects over short- and medium-run horizons. This seriously limits the quantitative importance of the Friedman mechanism for the United States.

## Currency of Pricing and Pass-Through

The broader question of optimality of a floating-versus-a-pegged exchange rate has been researched extensively in open economy macroeconomics. The presence of nominal rigidities in price setting generates trade-offs between the two exchange rate regimes. In a large class of models used to evaluate optimal policy, the currency of pricing is assumed to be *exogenously* chosen. In the short run when prices are rigid, there is a 100 percent pass-through into import prices of goods priced in the producer's currency and a zero percent pass-through for goods priced in the local currency. When prices adjust, there is no difference in pass-through. Exogenous currency choice results in stark outcomes, like the optimality of floating exchange rates under producer-currency pricing which ensures expenditure switching, and pegging under local-currency pricing which preserves the law of one price. A fundamental question then follows: is pass-through unrelated to the currency of pricing when prices adjust?

Oleg Itskhoki, Rigobon, and I address this question both empirically and theoretically in a paper that uses novel data on currency and prices for U.S. imports.<sup>4</sup> We show that even conditional on a price change, there is a large difference in the pass-through of the average good priced in dollars (25 percent) versus non-dollars (95 percent), both across countries and within disaggregated sectors. We also show that sectors that would be classified as producing more homogenous goods, like mineral products, are dollar priced sectors while differentiated sec-

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tors, like machinery, have a greater share of non-dollar pricers. Further, non-dollar pricers adjust prices less frequently than dollar pricers. These findings are inconsistent with the assumption, in an important class of models, that the currency of pricing is exogenous. We then present a model of endogenous currency choice and show that the predictions of the model are strongly supported by the data. We depart from existing literature by considering a multi-period dynamic pricing environment and provide conditions under which a sufficient statistic for currency choice can be empirically estimated using observable prices.

These findings require revisiting the debate on optimal exchange rate policy. The stark trade-off between floating and pegged exchange rates arises because firms are forced to price in one or the other currency. Once firms are allowed to choose currency optimally, they will choose it to fit their desired pass-through patterns, enhancing the effective amount of price flexibility and reducing the welfare gap between floating exchange rates and pegs. Further, exchange rate volatility affects currency choice which in turn affects exchange rate volatility, generating the possibility for multiple equilibria. A country that follows more stable monetary policies will experience greater price stability because more of the exporters to that country set prices in its currency. These effects can be first-order relative to the standard trade-offs emphasized in the literature.

## Frequency of Price Adjustment and Pass-Through

The importance of studying micro data is ultimately being able to comprehend key aggregate phenomena, such as the sluggish response of prices to shocks, and to discern which models of price setting best fit the data in order to deduce the impact of micro price stickiness on output and welfare. Itskhoki and I advance this literature by developing a new comparison of exchange rate pass-through and frequency of price adjustment across goods.<sup>5</sup> We document that goods displaying a high frequency of price adjustment have

a long-run pass-through that is at least twice as high as low-frequency adjusters in the data. Next, we prove theoretically that in an environment with variable mark-ups there should be a positive relation between frequency and long-run pass-through, as in the data. Moreover, we show that standard models with constant elasticity of demand and Calvo or state-dependent pricing fail to match the data. When we deviate from this standard framework and calibrate a dynamic menu-cost model with variable mark-ups, we show that it has substantial success in matching the features of the data. The empirical findings highlight a new selection effect that has important implications for the welfare consequences of measured price rigidity.

## Bridging Closed and Open Economy Research on Real Rigidities

The closed and open economy literatures work on estimating real rigidities, but in parallel.<sup>6</sup> Itskhoki and I survey both literatures and highlight areas of agreement and disagreement. One surprisingly consistent result across several studies, surprising since these studies use different methodologies and data sets, is that strategic complementarities, for example operating through variable markups, play little role for retail prices and appear to be quite important for wholesale prices. We then estimate the extent of real rigidities using empirical procedures employed in the closed- and open-economy literatures and with a common international price dataset. We show that, consistent with the presence of real rigidities, the response of reset-price inflation<sup>7</sup> to exchange rate shocks depicts significant persistence. Individual import prices, conditional on changing, respond to exchange rate shocks prior to the last price change. At the same time aggregate reset-price inflation for imports, like that for consumer prices, shows little persistence. In general, across closed- and open-economy literatures, the response to a specific shock suggests a more important role for real rigidities

than the point estimate of the autocorrelation of reset prices. When we quantitatively evaluate sticky price models (Calvo and menu cost) with variable markups at the wholesale level, we find that they generate sluggishness in price adjustment and increase the size of the contract multiplier, but their effects are modest.

## Failure of the Law of One Price

Relative cross-border retail prices, in a common currency, co-move closely with the nominal exchange rate. This well-known fact has spurred a long literature that attempts to determine the sources of this co-movement. Three co-authors and I use a new dataset with product-level retail prices and wholesale costs for a large grocery chain operating in the United States and Canada and decompose this variation into relative wholesale costs and relative markup components.<sup>8</sup> We find that the correlation of the nominal exchange rate with the real exchange rate is driven mainly by changes in relative wholesale costs, arguably the most tradable component of a retailer's costs. This new finding suggests that the empirical evidence is inconsistent with the traditionally assumed pricing-to-market at the retail level, but is consistent with pricing-to-market at the wholesale level. We then measure the extent to which national borders impose additional costs (over domestic costs) that segment markets across countries. We show that retail prices respond to changes in wholesale costs in neighboring stores within the same country but not to changes in wholesale costs in a neighboring store located across the border. Using a regression discontinuity design, we find a median discontinuous change in retail and wholesale prices of 24 percent at the international border. By contrast, the median discontinuity is zero for state and provincial boundaries, consistent with important "border effects".

## Summary

International prices of traded goods, as represented by U.S. imports and exports, demonstrate about one year of