Waiting or Paying for Healthcare: Evidence from the Veterans Health Administration

Anna Russo*

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Abstract

Healthcare is often allocated without prices, sacrificing efficiency in the interest of equity. Wait times then typically serve as a substitute rationing mechanism, creating their own distinct efficiency and distributional consequences. I study these issues in the context of the Veterans Health Administration (VA), which provides healthcare that is largely free but congested, and the Choice Act, a large-scale policy intervention that subsidized access to non-VA providers to reduce this congestion. Using variation in Choice Act eligibility in both patient-level and clinic-level difference-in-differences designs, I find that the price reduction for eligible veterans led to substitution away from the VA, an increase in overall healthcare utilization and spending, and reduced wait times at VA clinics in equilibrium. I then use the policy-induced price and wait time variation to estimate the joint distribution of patients' willingness-to-pay and willingness-to-wait. I find that rationing via wait times redistributes access to healthcare to lower socioeconomic status veterans, but at a large efficiency cost (-23%). By contrast, I find that a coarsely targeted, modest increase in copayments increases consumer surplus by more than the Choice Act, at lower cost to the VA, while disproportionately benefitting low-income veterans.

*Harvard University. Email: arusso@fas.harvard.edu.

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1 Introduction

> "In the end, each nation must decide which style of rationing — by the queue or by price and ability to pay — is most compatible with its culture. Mantras about the virtues of markets are no substitute for serious ethical conviction."
>
> Uwe Reinhardt (2007)

Many goods and services are allocated at below-market-clearing prices, sacrificing efficiency in the interest of equity (Tobin, 1970; Weitzman, 1977). This trade-off is particularly acute among healthcare systems worldwide, which were designed with explicit equity considerations that preclude rationing by price (Reinhardt, 1997; Cutler, 2002).[1] However, in the presence of scarcity, due to budget or capacity constraints, alternative rationing mechanisms must emerge to determine access to care. In healthcare, wait times for care often serve as this substitute (Cutler, 2002; Reinhardt, 2007, 2019) and represent a barrier to care in most OECD countries (OECD, 2020). Many countries have thus made the choice, either explicitly or implicitly, that allocating healthcare with wait times is preferable to doing so with prices.[2]

The choice of rationing mechanism — in practice, waiting versus paying on the margin — is a key question of international healthcare market design.[3] However, empirical research on the implications of alternative rationing mechanisms has been limited by both scarce data and the challenge of conducting welfare analysis in settings where consumers are not paying on the margin.

In this paper, I investigate the efficiency and distributional implications of rationing access to care via wait times versus prices. I also examine the performance of second-best policy

[1] For example, the Beveridge Commission, which led to the creation of the National Health Service (NHS) in the UK states: "From the standpoint of social security, a health service providing full preventive and curative treatment of every kind to every citizen without exception, without remuneration limit and without an economic barrier at any point to delay recourse to it, is the ideal plan." Similar ideas were included in the Canada Health Act of 1984, which states: "It is hereby declared that the primary objective of Canadian health care policy is to protect, promote and restore the physical and mental well-being of residents of Canada and to facilitate reasonable access to health services without financial or other barriers."

[2] This choice is particularly explicit in a recent (2022) case before the Supreme Court of British Columbia in Canada, in which the court ruled that even though the "public system had failed to provide timely medical treatment" paying for healthcare to avoid a queue is not in "accordance with principles of fundamental justice." See `https://www.bccourts.ca/jdb-txt/ca/22/02/2022BCCA0245.htm` for more details.

[3] See, for example, discussion in Sanders et al. (2014).

instruments that attempt to manage rationing costs while still imposing strong restrictions on the use of prices to determine access to care. I focus on the setting of waiting for outpatient care at the Veterans Health Administration (VA) in the United States. The VA combines unusually rich data on wait times with a major policy intervention designed to address rationing costs, which induced variation in both wait times and prices.

The VA is a useful empirical setting for four reasons. First, the VA is of substantial policy interest in the US, providing care to over nine million veterans. Second, it is relevant to cross-country debates about healthcare market design, as the VA system shares many characteristics with common international comparisons, e.g. the U.K.'s National Health Service. Copayments are regulated at low — often zero — rates, and the market for outpatient care instead clears on wait times. Third, the Veterans Access, Choice, and Accountability Act of 2014 (the "Choice Act"), which made certain veterans eligible to receive subsidies for non-VA providers, provides a large-scale policy change that shifts prices, and in equilibrium, wait times. In addition to providing useful variation, this class of policy intervention is a common form of "managed rationing" with similar interventions across the globe.[4] Fourth, I am able to assemble a comprehensive dataset that measures VA wait times combined with utilization across both VA and non-VA providers to examine choices in response to variation in *both* prices and wait times.

I begin by leveraging the eligibility conditions for the Choice Act in two sets of of difference-in-differences designs. First, I examine the direct effects of the policy, which made veterans eligible to obtain care at non-VA, or "community" providers, at (the lower) VA copayment rates, if they lived more than forty miles from their closest VA clinic, lived in a state without a VA hospital, or needed to wait over thirty days for care. I focus on the forty-mile threshold and document, consistent with prior work (Rose et al., 2021; Saruya et al., 2023), that veterans increase community outpatient utilization and overall outpatient spending in response to the policy. Approximately half of the increase in community utilization is driven by substitution from VA care, and half is an increase in overall utilization. This analysis illustrates that veteran choices respond to changes in price. Moreover, the policy achieved its intended effect of increasing access to care among the directly eligible, but at a cost of increased spending.

I next examine whether policy-induced substitution away from the VA achieved the policy's second goal of alleviating capacity constraints on congested clinics and reducing wait times in equilibrium. I test for this using clinic- and market-level exposure designs, with exposure

[4]See OECD (2020) for Portugal and Denmark, Propper et al. (2008) for the UK, Ringard et al. (2016) for Norway, and the website of the agency that manages such a program in Chile.

determined by the share of pre-period patients who would have been eligible for the Choice Act subsidies. I document evidence of equilibrium effects on wait times: moving from the 10th to the 90th percentile of exposure reduces wait times by between 5 and 13 days. All veterans benefit from reductions in wait time, regardless of eligibility. Equilibrium effects therefore provide a second dimension of variation: within a market, changes in eligibility isolate changes in price, while conditional on any given veteran's eligibility status, the cross-location share of *others* who are eligible provides variation in wait times.

I use these two sources of variation to describe the screening properties of the two rationing mechanisms, as the welfare and allocative effects of the two regimes depend on heterogeneity in willingness-to-pay and willingness-to-wait. I first document evidence consistent with the equity motive to relinquish a price mechanism: lower income and sicker veterans are substantially more responsive to the Choice Act-induced price change than higher income veterans. This presents the tension for a planner designing a healthcare system with preferences for redistributing to lower income, sicker veterans. But while the choice to relinquish a price mechanism is intentional, its substitute — wait times — arises endogenously instead of through careful design, with unknown screening properties. I document qualitatively similar patterns of screening along the two rationing mechanisms: lower income and sicker veterans are also more likely to be screened out at higher wait times. These similar qualitative patterns of screening place a bound on the extent to which rationing via wait time can be a useful redistributive tool for a planner, but are consistent with both a meaningful equity-efficiency trade-off and a scenario in which status quo rationing regimes are adverse to both efficiency and distributional goals.

To quantify the allocative effects, efficiency costs, and redistribution of surplus across the two rationing mechanisms, I develop and estimate a model of clinic choice and queuing for primary care providers to estimate the joint distribution of willingness-to-pay and willingness-to-wait. In the model, wait times arise endogenously in response to veteran preferences and capacity constraints. Veterans make decisions over if and where to receive care, across VA and community options, trading off observed and unobserved clinic characteristics, travel times, wait times, and prices. I assume VA clinics are capacity constrained with wait times generated via a First-Come-First-Served queuing protocol, while community providers are uncapacity constrained. I use the Choice Act policy variation to account for endogeneity in both wait times and prices with similar empirical strategies and under similar assumptions as in the quasi-experimental analysis.

I estimate that veterans are responsive to both prices and wait times, with wait time elasticities approximately three times as large as price elasticities. The average veteran has a cost of delay — the amount a veteran would be willing to pay to move an appointment one day earlier — of approximately \$2.50 per day with substantial dispersion around this average (\$0.93 at the 10th percentile to \$3.64 at the 90th percentile). This is a key parameter of interest that could not be obtained from descriptive analyses alone: it governs both the magnitude of the efficiency costs of waiting and any redistribution of surplus. Despite the qualitatively similar patterns of screening, higher income veterans have the highest costs of delay (in dollars). Put differently, wait times implicitly discriminate in favor of lower socio-economic status veterans.

With the estimated preferences, I examine counterfactual allocations under alternative rationing regimes. I focus on comparing the polar cases of the status quo rationed regime, where wait times clear the market at regulated, low prices, versus a counterfactual in which prices adjust flexibly to achieve zero wait times, holding VA capacity fixed. Under the counterfactual flexible pricing regime, veterans would be required to pay \$78 at the median clinic (approximately 20% of costs) per primary care visit, versus \$5 under the status quo. Binding price controls have a substantial impact on allocations: 16% of veterans who would have used VA care under the status quo would not under the flexible pricing regime. These veterans are lower income, sicker, and older.

I use a revealed preference approach to quantify the efficiency and distributional effects of these descriptive patterns. I define an efficient benchmark, subject to available capacity, as a regime that maximizes money-metric surplus (Kaldor, 1939; Hicks, 1939). This is achieved under the flexible pricing regime. Relative to this benchmark, rationing with wait times imposes substantial efficiency costs equivalent to 23% of achievable surplus, due to both deadweight loss from "money burnt" in costly screening via waiting (71%) and allocative distortions away from the highest willingness-to-pay consumers (29%). However, despite the wait-based regime's large costs on average, over 50% of veterans, who are lower income, sicker, and older than the overall population, prefer status quo rationing by waiting.

My estimates allow me to qualitatively evaluate the trade-off between efficiency and distributional concerns facing a planner. Though a planner's distributional preferences are inherently unknown, I show that rationing with wait times is an extremely inefficient form of redistribution, destroying over \$5 of surplus for every \$1 gain for the winners under the status quo. This is inefficient both relative to the tax schedule (Hendren, 2020), and in absolute terms: the switch to market-clearing prices can achieve close to a Pareto improvement even with the blunt instrument of uniform transfers. This finding is driven by the basic descriptive patterns of screening: because the two instruments screen on qualitatively similar dimensions, the rationing regime imposes large deadweight losses for any limited socially desirable redistribution of surplus.

Finally, I compare the gains from changes in the allocation mechanism to "managed rationing" policies observed in practice, including the Choice Act. Not only does the Choice Act not approach the gains from relaxing controls on pricing VA care, the policy *reduces* social welfare, as consumer surplus gains do not outweigh the increase in costs. This occurs both because the marginal veteran is not willing to pay the full cost of care and because the policy is poorly targeted. By contrast, a small targeted copayment increase at the VA, an improvement on both dimensions, dominates the Choice Act. It raises consumer surplus — concentrated among the lower income veterans who are not targeted by the copay increase — despite increasing prices, and generates revenue, instead of increasing costs. Though this policy falls far short of the gains from eliminating price controls altogether, its performance underscores that carefully relaxing price controls can lead to large welfare gains, even when considering the distributional concerns that motivate them.

Related Literature This paper contributes an empirical application to two related theory literatures in market design and public finance. In market design, I draw on both theoretical work investigating the efficiency (Bulow and Klemperer, 2012; Che et al., 2013) and redistributive (Weitzman, 1977; Dworczak et al., 2021; Akbarpour et al., 2022) implications of price controls and a distinct literature on money-burning mechanisms generally (Hartline and Roughgarden, 2008; Condorelli, 2012; Yang, 2022; Dworczak, 2022; Yang et al., 2024) and equilibria in wait times, specifically (Leshno, 2022). Second, I contribute to the classic public finance theory on the use of ordeals to achieve targeting or redistributive goals (Nichols et al., 1971; Nichols and Zeckhauser, 1982; Besley and Coate, 1992) and benchmark the performance of the ordeal against a price mechanism with transfers (Zeckhauser, 2021).

My empirical analysis, which focuses on allocative effects of alternative rationing mechanisms, combines and builds on both a large, recent literature examining the screening properties of ordeals (Alatas et al., 2016; Dupas et al., 2016; Deshpande and Li, 2019; Finkelstein and Notowidigdo, 2019; Brot-Goldberg et al., 2023) and a more limited literature analyzing the allocative effects of price controls (Glaeser and Luttmer, 2003; Davis and Kilian, 2011; Ryan and Sudarshan, 2022). In my setting, ordeals arise endogenously to capacity constraints, and I quantify the allocative effects, redistributive properties, and deadweight loss jointly via revealed preferences, as in Waldinger (2021) and Lieber and Lockwood (2019). Relative to these papers, I investigate a distinct but central trade-off: the use of an efficient versus an inefficient screening instrument to target a transfer.

My preference specification also connects to a literature on ride-hail that estimates preferences over prices and wait times jointly (Buchholz et al., 2020; Castillo, 2022; Fréchette et al., 2019). Similar to these papers, a key object of interest is a willingness-to-pay to reduce wait times, obtained by observing and quantifying delay and dollar trade-offs.

Most narrowly, my focus on wait times in healthcare and the Choice Act connects to work quantifying other sources of inefficiency in waitlists for primary care (Huitfeldt et al., 2024) and literatures studying demand responses to wait times for healthcare (Besley et al., 1999; Martin and Smith, 1999; Pizer and Prentice, 2011a,b; Yee et al., 2022b), the Choice Act specifically (Rose et al., 2021; Saruya et al., 2023), and the impact of subsidies for private care on public sector hospitals, more generally (Propper et al., 2008; Cooper et al., 2018).

2 Conceptual Framework

I present a stylized equilibrium framework to illustrate the welfare consequences of alternative healthcare rationing mechanisms. The framework also highlights the questions and challenges that will motivate the structure of my empirical analysis.

Demand There exists a unit mass of consumers, indexed by i, each obtaining utility from the separable consumption of healthcare and all other goods (c). Utility from healthcare is given by $h_i - \gamma_i w$, where h_i indicates an individual's value for healthcare services today, and γ_i captures i's costs of waiting w days for a visit. γ_i incorporates the myriad reasons why a consumer may dislike waiting for care: physical discomfort, anxiety, a reduced ability to work, further reductions in health capital, or a preference to be seen immediately. In addition to healthcare, consumers value the consumption of all other goods with an increasing and concave function $u(c)$. I normalize the price of all other consumption to one.

Given price p and wait time w for care, consumer i solves:

$$\max_{x \in \{0,1\},\, c} \; (h_i - \gamma_i w) \cdot x + u(c) \quad \text{s.t. } x \cdot p + c = y_i \tag{1}$$

where $x \in \{0,1\}$ denotes whether to forgo or consume care, and y_i is i's income. Define $x_i(p,w)$ as i's (unit) demand for care and $v_i(x_i(p,w), p, w)$ as i's indirect utility at any (p,w) combination. Total demand in the market is given by $D(p,w) = \int x_i(p,w) f(i) di$. For each individual i, define the dollar-denominated cost of waiting $C_i(w)$ as the price at which i is indifferent between waiting w and paying $C_i(w)$ for $x = 1$.[5]

[5] Specifically, $C_i(w)$ is implicitly defined by $v_i(1, C_i(w), 0) = v_i(1, 0, w)$.

Supply and Equilibrium As in my empirical application, I assume care is provided by a strictly capacity- (or budget-) constrained social planner, with supply $\kappa < 1$. Waiting times w are generated anonymously via a First-Come-First-Served queuing mechanism. Also consistent with my empirical application, I assume that κ is sufficiently low such that $D(0,0) > \kappa$. In equilibrium $D(p,w) = \kappa$, with a continuum of (p,w) combinations each determining an equilibrium. I focus attention on the polar case used in practice, $(0,w^*)$, and a flexible pricing benchmark, $(p^*,0)$.

Social welfare Fairness and redistribution are often the motivation for price controls and the subsequent use of an alternative mechanism to ration scarce capacity. To capture this, I define social welfare at any (p,w) equilibrium:

$$SW(p,w) = \int g_i \, v_i\left(x_i(p,w), p, w\right) f(i)di + g^G p\kappa \tag{2}$$

where g_i denote welfare weights, or the value that a social planner assigns to the welfare of individual i. The term g^G modulates the value of any revenue collected. I take capacity κ as given (consistent with the assumption of strict capacity constraints) and focus on the allocation problem facing a social planner.

In the spirit of Saez and Stantcheva (2016), g_i could theoretically encompass any societal concern for fairness that motivates relinquishing a price mechanism. In my empirical application, I will focus in particular on the distributional implications of the choice of rationing mechanism along income and health status.

The change in welfare between the $(0,w^*)$ and the $(p^*,0)$ regimes can be decomposed as follows:

$$\begin{aligned} SW(0,w^*) - SW(p^*,0) = \int g_i \Bigg(& \underbrace{v_i\left(x_i(0,w^*), 0, w^*\right) - v_i\left(x_i(p^*,0), 0, w^*\right)}_{\text{change in allocation}} + \\ & \underbrace{v_i\left(x_i(p^*,0), 0, w^*\right) - v_i\left(x_i(p^*,0), p^*, 0\right)}_{\text{change in payoff} \mid \text{allocation}} \Bigg) f(i)di - \underbrace{g^G p^* \kappa}_{\text{revenue}} \end{aligned} \tag{3}$$

The first term highlights that changing the mechanism will shift the set of individuals who obtain care. The second term arises because, even conditional on an allocation, the different demand curves will lead to differences in consumer surplus. The final term illustrates that a price mechanism generates transfers between consumers and the government (who collects revenue), whereas waiting is pure social waste. With a complete set of transfers available, allocating care to the highest willingness-to-pay individuals maximizes social surplus, regardless of g_i (Kaldor, 1939; Hicks, 1939). This allocation, achieved by the price mechanism, is the efficient benchmark.

Figure 1 illustrates both the efficiency and distributional consequences of the two regimes by plotting (example) demand curves and cost curves induced by the different mechanisms. The line AC represents the demand (WTP) curve. By contrast, the line AB plots the demand curve induced by a waiting time mechanism in money-metric (WTP) space: it plots the *willingness-to-pay* among all consumers with *willingness-to-wait* above the market-clearing waiting time, w^*. The line AB must lie (weakly) below the line AC, and the area between these curves represents the allocative efficiency loss from rationing by waiting. Second, while the price mechanism merely involves splitting surplus between consumers (the area above p^*) and the government (the area below p^*), the waiting time mechanism induces a cost $C(w^*)$ for those who wait. The area underneath this curve is pure deadweight loss.

Figure 1 also illustrates the distributional consequences of the two regimes. Example consumer j obtains care, and positive surplus, under the waiting time mechanism where he would not have under the price mechanism. Example consumer i obtains care under both regimes, but obtains higher consumer surplus under the waiting regime versus the price regime. Others lose: the entire region between the curve AC and the curve AB, represent consumers who are displaced from care under the waiting time regime.

Although the highest money-metric surplus achievable occurs with a price mechanism, the alternative rationing regime redistributes consumption and surplus across consumers, potentially toward high g_i types. Thus, a planner (potentially) faces a trade-off between maximizing overall (money-metric) efficiency and redistributing surplus to high g_i types (a notion of equity). The existence and slope of this trade-off depend on the magnitude of efficiency losses and the extent of redistribution across types. This in turn depends on the joint distribution of willingness-to-pay, willingness-to-wait, and characteristics that may influence social welfare weights g_i, such as income or health status. This joint distribution will be my key empirical object of interest.

Estimating this joint distribution is typically hindered by three challenges. First, consumers are not paying on the margin for goods when they are rationed without prices. Second, money-burning activities — in this case, waiting — are infrequently recorded in standard datasets, making it difficult to quantify the surplus dissipated to arrive at a given allocation. Finally, as wait times are determined in equilibrium, even if observed, they are subject to the same simultaneity concerns that present challenges to demand estimation in standard markets. In the next section, I discuss the VA setting and data, with particular emphasis on the unique features of the setting that allow me to overcome these challenges.

3 Setting and Data

3.1 The Veterans Health Administration

The Veterans Health Administration (VHA, or VA) of the Department of Veterans Affairs is the largest integrated healthcare system in the United States. The system serves over 9 million veterans with a budget of over $80 billion (Department of Veterans Affairs, 2023). The VA has historically provided the vast majority of inpatient and outpatient care at 170 VA hospitals and over 1,000 VA community-based outpatient clinics across the United States. However, in recent years, the VA has also financed an increasing amount of care for VA enrollees at non-VA, or "community," providers. I focus specifically on outpatient care, with a particular emphasis on primary care, as these are settings where wait times and access to care are of particular concern at the VA (Yee et al., 2022a,c; 113th Congress, 2014; 115th Congress, 2018) and other settings (Mark, 2023; Huitfeldt et al., 2024).

Eligible veterans[6] pay no premiums for access to VA care, but may be obligated to pay copayments. Three quarters of veterans pay no copayments at all for outpatient care. Approximately one quarter of veterans pay $15 and $50 for primary and specialty outpatient care, respectively. Whether or not a veteran pays copayments depends on their assigned priority group, which depends on a veteran's service-connected disabilities, service history, and income. Many veterans use the VA in combination with other sources of coverage. Approximately half of veterans are dually enrolled in Medicare.

Due to the combination of budget and capacity constraints and regulated copayments, the market for outpatient care at the VA clears on wait times to access care (Yee et al., 2022a). Wait times, and their impact on veterans' access to care, has been the subject of concern and policy activity at the VA for over two decades (U. S. Government Accountability Office, 2001, 2012, 2016, 2019; 113th Congress, 2014; 115th Congress, 2018).

The Veterans Access, Choice, and Accountability Act of 2014 I focus on the policy context of the Veterans Access, Choice, and Accountability Act of 2014 (the "Choice Act"). Motivated by concerns that veterans were unable to obtain care in a timely manner,

[6] Veterans are eligible to enroll in the VHA if they served in the active military, naval, or air service and were not dishonorably discharged.

the Choice Act dramatically expanded subsidized access to outpatient care at non-VA, or "community," providers. Eligible veterans could obtain care at community providers paying VA copayment rates (zero, or \$15-\$50, depending on priority group). These providers were then paid Medicare rates by the VA. Veterans were eligible if they lived over 40 miles from their nearest VA clinic, lived in a state without a VA hospital (Alaska, Hawaii, or New Hampshire), or needed to wait over thirty days to obtain an outpatient appointment at a nearby clinic.

The Choice Act aimed to alleviate capacity constraints at the VA via two channels. The first channel is the direct expansion in access for eligible veterans, who experience a reduction in the out-of-pocket price for community providers. The second channel is the equilibrium effect of reduced wait times for *everybody* as eligible veterans substitute away from the VA. In theory, the Choice Act policy therefore provides both variation in prices and wait times, exactly the variation necessary to estimate the joint distribution of willingness-to-wait and willingness-to-pay. Beyond its instrumental use, the Choice Act provides a rich laboratory for policy analysis. At the VA, the Choice Act prompted a a major shift in the delivery of care: in 2018, eligibility was expanded under the MISSION Act, and today, approximately 20% of the VA budget is dedicated to financing non-VA care (Department of Veterans Affairs, 2023). Beyond the VA, offering subsidies for private utilization is a common policy tool to alleviate congestion among public sector healthcare providers worldwide.

3.2 Data

I assemble a comprehensive dataset describing VA enrollees and their VA and non-VA utilization. Throughout the paper, I will refer to utilization at non-VA providers as community utilization (the VA terminology). My analysis sample includes all enrollees from fiscal years 2011-2017 from the ADUSH (Assistant Deputy Under Secretary for Health) file. This file includes demographics such as age, priority group, income measured via VA means tests, date of death, and summary measures of utilization, as well as veterans' exact residential address and whether it grants them distance-eligibility under Choice for all enrolled veterans.

I measure VA utilization, as well as additional veteran characteristics, using data recorded in electronic health records (EHR) from encounters at all VA hospitals and clinics.[7] An advantage of this data is that the EHR integrates with the appointment scheduling system, allowing me to measure wait times. Specifically, I measure wait times as the number of days between the date of an appointment request and the appointment itself (Yee et al., 2022a;

[7]This data is recorded in the VA's Corporate Data Warehouse (CDW).

Chartock, 2023). These data are unavailable in commonly used claims datasets, which only record the date of service and not the date of request.

Despite this unique data availability, constructing the appropriate measure of wait times presents several challenges. First, wait times are only recorded if an individual makes an appointment. I construct the menu of wait times facing each patient based on average clinic wait times facing all patients who obtained an appointment at that clinic within a given time period. Second, this aggregation presents its own challenge, as the distribution of observed wait times may be selected. I address this with a supply-side queuing model, discussed in more detail in Section 5.4. A final threat to measurement occurs if appointments are scheduled far in advance of when the appointment is actually desired. In my sample period, scheduling appointments over 90 days in advance was prohibited, reducing dramatically the extent of follow-up appointments that erroneously appear as long wait times. I also follow previous work (Yee et al., 2022a; Pizer and Prentice, 2011b) and assess the robustness of my results to wait times constructed using only new patients.

I supplement the data on VA utilization with multiple sources describing community utilization. First, I use all authorizations (internal documentation) and claims (payments to providers) for care financed by the VA at community providers. Second, for the 36% of veterans who are dually enrolled in Traditional Medicare (TM), I link the universe of Medicare claims to VA utilization. For these veterans, I am able to observe all healthcare utilization across VA and community providers.

I also use estimates of average VA costs produced by the Health Economics Resource Center (HERC).[8] Together with the claims data, these cost estimates allow me to calculate expenditures across VA and community care.

Summary Statistics (Veterans) Table 1 presents summary statistics of veteran characteristics and utilization for the entire enrolled population (column 1), the sub-population that is dually eligible for Traditional Medicare (TM), where I observe the universe of community utilization (column 2), and the Choice-Act distance-eligible (column 3) and ineligible (column 4) populations. The VA population skews male and old. The average veteran income, measured using means tests conducted throughout a veteran's enrollment at the VA, is lower than the U.S. median over this time period, but with substantial dispersion.

Many veterans have other sources of coverage and obtain healthcare at the VA and elsewhere. For some veterans, I therefore do not observe the universe of healthcare consumption. For

[8] These data calculate encounter-level VA utilization by using Medicare relative value weights to distribute aggregate clinic-by-category VA costs.

those dually enrolled in Traditional Medicare (column 2), I observe all utilization inside and outside the VA. In this population, 24% saw both a VA and a non-VA primary care provider in the same year, and 51% saw both a VA and non-VA primary care provider at one point in the sample period. Spending per veteran at the VA is $5,148, with the average veteran obtaining 7.5 outpatient visits and one primary care visit annually at the VA.

Summary Statistics (Clinics) Figures 2a and 2b present histograms of clinic-level wait times, calculated as the average wait time among requested appointments in a given clinic and quarter, for all specialties and for primary care.[9] I focus on primary care specifically because it is a more uniform "product" and wait times for primary care have been used and validated in prior work at the VA (Yee et al., 2022a). Most wait times are between two to six weeks, with a right tail. Figures 2c and 2d plot a measure of the distribution of each clinic's "exposure" to the Choice Act policy, or the extent to which the policy could impact equilibrium congestion, for all specialties and for primary care. Specifically, Figures 2c and 2d plot the distribution of the share of visits that satisfy the Choice Act eligibility requirements at each clinic for each specialty *preceding* the Act's enactment. Figures 2c and 2d documents dispersion in exposure.[10]

4 Choice Act Policy Analysis

4.1 Empirical Strategies

Direct Effects To analyze the direct effect of the Choice Act, I compare eligible veterans, who experienced a reduction in price for community providers, to ineligible veterans, who did not. My empirical strategy leverages the distance eligibility requirement in the following veteran-level difference-in-differences specification:

$$y_{it} = \sum_{\tau \neq 2014} \beta_t \cdot \mathbb{1}\{t = \tau\} \cdot 40Miles_i + 40Miles_i + \theta_t + \epsilon_{it} \tag{4}$$

[9]I discuss this aggregation and address the possibility of selection and therefore bias in preference estimates in Section 5.4. In this section, I present raw average wait times.

[10]Following prior research (Yee et al., 2022b,a; Pizer and Prentice, 2011a), the measurement of wait times in Figures 2a and 2b and Figures 2c and 2d do not correspond exactly. This is because Choice Act wait-time eligibility is based upon a patient's "desired date," which I do not use to calculate wait times, as it has been subject to manipulation by clinics (U. S. Government Accountability Office, 2012).

where $40Miles_i$ is an indicator for whether veteran i lives more than 40 miles from her closest clinic, β_t are the coefficients of interest on fiscal years (t) among eligible veterans, and θ_t are fiscal year fixed effects.[11] The policy was enacted starting in fiscal year 2015, and I normalize the 2014 coefficient to zero. Outcomes y_{it} include a range of utilization and clinic choice-related outcomes. Estimation restricts to veterans within a 10 mile window around the 40 mile threshold. I cluster standard errors at the veteran level.

I also summarize results in a pooled difference-in-differences specification:

$$y_{it} = \beta \cdot \mathbb{1}\{t > 2014\} \cdot 40Miles_i + 40Miles_i + \theta_t + \epsilon_{it}. \tag{5}$$

I focus on the distance eligibility condition, as this is a permanent policy change that applies to all types of outpatient care. The wait-time eligibility condition is time varying and market-specific, based on equilibrium wait times and the category of care sought. Appendix A.2 uses the wait time eligibility condition in a similar analysis using variation in eligibility across markets and over time.

Equilibrium Effects To examine equilibrium effects on wait times, I leverage variation in the distribution of eligible veterans across markets and clinics. I use the variation in pre-Choice exposure, illustrated in Figures 2c and 2d, in market- and clinic-level difference-in-differences design:

$$w_{jt} = \sum_{\tau \neq 2014} \eta_t \cdot \mathbb{1}\{t = \tau\} \cdot ShareEligPre_j + \phi_j + \chi_t + \epsilon_{jt} \tag{6}$$

where w_{jt} denotes the wait time for a given market (HRR by specialty) or clinic j in year t, $ShareEligPre_j$ is the pre-period share of visits that would have been eligible under the Choice Act, and ϕ_j and χ_t are market or clinic fixed effects (depending on the specification) and time fixed effects, respectively. The coefficients η_t capture the relative time paths of wait times for more versus less Choice-exposed locations across the country. I cluster standard errors at the market or clinic level, depending on the specification.

The intuition for equation 6 is that locations (clinics or markets) with more Choice-eligible potential consumers may face a larger decrease in demand than clinics with fewer choice-

[11] Appendix Table A.1 presents results including closest clinic (for which eligibility is determined) by year controls. Results are similar.

eligible potential consumers, and thus may have shorter wait times in equilibrium. I focus only on equilibrium effects at VA clinics. The VA population is small relative to the market as a whole, making equilibrium effects outside the VA unlikely.

As with the direct effects, I also summarize the impact of the policy's equilibrium effects on wait times in a pooled difference-in-differences design

$$w_{jt} = \eta \cdot \mathbb{1}\{t > 2014\} \cdot ShareEligPre_j + \phi_j + \chi_t + \epsilon_{jt}. \tag{7}$$

4.2 Results: Direct Effects

Choices and Spending Figure 3 plots coefficient estimates of β_t from equation 4 and Table 2 reports analogous estimates from the pooled specification in equation 5. Figure 3a plots estimates for the outcome of community visits per veteran per year and shows that eligible veterans, who experienced a decrease in out of pocket payments at community providers, obtain more care at community providers than ineligible veterans. Figure 3b plots *total* community utilization, both VA-financed and not, for the Traditional Medicare sample and shows similar patterns. This confirms that the reduction in prices for community providers increased community care utilization. By 2017, this increase in visits represents a 3-6% increase as a share of total pre-period community utilization for this sample.

Figure 3c shows a reduction in VA utilization among eligible veterans. Approximately half of the increase in community utilization is substitution away from the VA. The remaining represents an increase in overall utilization (Figure 3d), corresponding to an increase in total VA spending of approximately \$28 per eligible veteran, per year (Figure 3e).

Additional Results Table 2 shows similar results across measures of utilization: visits, relative value units (RVUs), or spending. Table 2 also presents additional results on the characteristics of chosen clinics. Veterans substitute toward less congested and closer clinics, decreasing their total wait and and travel times for care. Appendix A.2 also presents results exploiting the wait time eligibility conditions. These results document similar increases in private utilization at the clinic level, but no decrease in overall VA utilization, consistent with the assumption that wait times arise due to capacity constraints at the VA.

Appendix Figure A.3 investigates the impact of Choice Act eligibility on veteran health and finds no statistically significant impact on mortality or inpatient admissions. This motivates a revealed preference approach; welfare in this outpatient context may be better reflected in consumer choices than in outcomes like mortality.

Heterogeneity Heterogeneity in willingness-to-pay is central to the efficiency and distributional consequences of alternative rationing mechanisms. The Choice Act provides useful variation to examine this heterogeneity across veterans with different observable characteristics. I estimate equation 4, split by income (above versus below median income) and health status (above versus below median prior healthcare utilization). Estimation restricts to the market for primary care[12] and a sample of veterans facing the same Choice Act-induced price change.[13] This avoids confounding heterogeneous responses to price with compositional changes in services sought or prices charged. The outcome of interest is community primary care visits; estimates are presented in Figure 4.

Figure 4 demonstrates that poorer, sicker veterans increase community utilization more in response to the change in price induced by the policy. This is the the primary equity or redistributive concern presented by allocating healthcare with prices: lower income consumers are often the most responsive to prices. While this pattern is common across markets, it presents a dilemma in settings where fairness concerns are relevant, as in healthcare markets, because raising prices may screen out lower socio-economic status consumers.

4.3 Results: Equilibrium Effects

Wait Times Figure 3c demonstrates that a substantial share of eligible veterans substitute away from VA care when eligible for the Choice Act. This presents the possibility that the Choice Act could impact *all* veterans, including those who are ineligible or inframarginal, via reductions in equilibrium clinic wait times. Figure 5 plots coefficient estimates of equation 6 to test this directly, estimating the effect on wait times in three specifications: (1) across all specialties and geographies (HRRs) (Figure 5a), (2) for primary care at the market level (Figure 5b), and (3) for primary care at the clinic level (Figure 5c). Coefficients in Figure 5 are scaled to represent a move from the 10th to the 90th percentile of the exposure distribution.

Figure 5 shows that the Choice Act reduced congestion at the VA: wait times decreased by 13 days across all specialties and by 5 days in primary care, at the most exposed (90th

[12] Appendix Figure A.4 shows results for primary care and documents similar patterns as Figure 3.

[13] Specifically, I focus on the sample of Traditional Medicare veterans without a Medigap plan.

percentile), relative to the least exposed (10th percentile), markets and clinics.[14] This is a 15-30% reduction in wait times based on the pre-period average of 34 days (primary care) and 43 days (overall).

Heterogeneity While a distributional motivation for avoiding high prices is clear from Figure 4, heterogeneity in *willingness-to-wait* ultimately determines the distributional consequences of status quo low prices at the VA. I investigate differential demand responses to the changes in wait time induced by the Choice Act, estimating the following clinic-level two-stage-least-squares specification:[15]

$$w_{jt} = \theta \cdot \mathbf{z}_{jt} + \phi_j^w + \chi_t^w + \epsilon_{jt} \tag{8}$$

$$\ln(s_{jt}^d) = \beta \cdot w_{jt} + \phi_j^s + \chi_t^s + \nu_{jt} \tag{9}$$

where $\mathbf{z_{jt}}$ are instruments for Choice exposure, $\left(\phi_j^w, \phi_j^s\right)$ and $\left(\chi_j^w, \chi_j^s\right)$ are market or clinic fixed effects and time fixed effects, and $\ln(s_{jt}^d)$ is the log market share of clinic j among demographic group d of *non-Choice eligible* veterans. I again zoom in on primary care.

The first stage, equation 8, is a more general version of the difference-in-differences estimator discussed in Section 4.1 with a first stage illustrated in Figure 5. However, instead of parameterizing exposure as a continuous interaction, $\mathbf{z}_{jt} = \mathbb{1}\{t > 2014\} \cdot ShareEligPre_j$, which was amenable to event-study plots in Figure 5, I parameterize $\mathbf{z}_{jt}$ more flexibly as deciles of Choice eligibility exposure interacted with a post-2014 indicator. These instruments increase power but exploit the same policy variation summarized in Figure 5.

Table 3 presents results and documents *similar* patterns of screening along income and health status as prices. Lower income veterans reduce utilization due to high wait times more than higher income veterans, with similar patterns for sicker (vs. healthier) veterans. Appendix Figure A.6 replicates these screening patterns using all panel variation in wait times.

4.4 Discussion

The quasi-experimental analysis of the Choice Act yields insights about the two rationing mechanisms of interest and the performance of the Choice Act policy. First, veteran choices

[14] Appendix Figure A.5 also shows reductions in new patient wait times, a commonly used measure in prior work (Yee et al., 2022a; Pizer and Prentice, 2011b).

[15] Because markets experience different changes in wait times depending on their demographic composition, I instrument for a given change in wait times instead of examining the reduced form. As in the previous sub-section analyzing price variation, this avoids confounding heterogeneous responses to wait times with heterogeneous changes in wait times.

are responsive to both wait times and prices with qualitatively similar screening patterns. Second, the Choice Act benefited veterans both directly, through reduced prices, and indirectly, through reduced wait times, at an increased cost to the VA.

However, the quasi-experimental analysis does not estimate willingness-to-pay or the costs of waiting directly. This is necessary to assess the welfare implications of rationing with wait times versus prices *and* the Choice Act or alternative policies. In the next section, I develop a model that uses the Choice Act variation in prices and wait times to estimate the joint distribution of willingness-to-pay and willingness-to-wait to conduct welfare and counterfactual analyses.

5 Clinic Choice Model

I develop a model of demand for primary care in the presence of capacity constraints. Veterans make decisions over if and where to receive care, across VA and community options, as a function of varying observable characteristics, including travel time, wait time, and out of pocket prices, and unobservables. VA clinics are subject to capacity constraints, and wait times arise endogenously to excess demand.

5.1 Demand

The indirect utility of veteran i in market m choosing primary care clinic j in quarter t is

$$u_{ijmt} = \mathbf{x}_{jt}\beta\left(\mathbf{z}_i\right) + \theta\left(\mathbf{z}_i\right)d_{ij} + \gamma\left(\mathbf{z}_i\right)w_{jmt} + \alpha\left(\mathbf{z}_i\right)p_{jmt} + \xi_{jmt} + \epsilon_{ijmt} \tag{10}$$

with the value of the outside option to obtain no primary care normalized to zero.[16] The key aspect of this demand specification is that consumers have preferences over both prices and wait times, as in the stylized set-up in Section 2. Veterans face a per-day cost of waiting parameterized by $\gamma\left(\mathbf{z}_i\right)$, and dislike prices, parameterized by $\alpha\left(\mathbf{z}_i\right)$.[17] Veterans also have preferences over observable clinic characteristics $\mathbf{x}_{jt}$, travel distance d_{ij}, and unobservables. ξ_{jmt} is an unobserved demand shock for a given clinic-market-quarter, and ϵ_{ijmt} is an idiosyncratic preference shock, drawn from a Type 1 Extreme Value distribution with scale equal to one. All other preference heterogeneity is parameterized by observables $\mathbf{z}_i$.

[16] When veterans schedule an appointment, they work with a scheduler who can provide information about the options available to them. A website is also available for veterans to observe average wait times at each clinic. I therefore assume veterans know all of the characteristics of the clinics in their choice set.

[17] $\alpha\left(\mathbf{z}_i\right)p_{jmt}$ represents a local approximation to the general utility function presented in Section 2.

The geographic extent of each market is a Hospital Referral Region (HRR).[18] A market m refers to a subset of an HRR in which all veterans face the same vector of prices across clinics over time. Specifically, a market m is defined by a geography g (HRR) and an out-of-pocket payment class o. Because some veterans pay copayments and some do not, and some veterans are eligible for the Choice-Act and some are not, there is within-HRR variation in prices that I segment into distinct markets. I use a relatively large geographic healthcare market — there are 306 HRRs in the US — to capture the sparsity of VA clinics and the fact that veterans travel long distances for care.

Veterans choose among all VA clinics and community clinics in their HRRs, as well as the outside option of no care. The universe of potential community primary care providers is very large. I therefore aggregate all community providers to the Hospital Service Area (HSA)-level, resulting in 3,436 community clinics.[19]

5.2 Supply

VA Clinics I assume strict capacity constraints at observed levels of utilization κ_{jt}, measured as the number of primary care visits per quarter, at all VA clinics. This assumption simply restricts to counterfactuals that hold the number of VA visits constant.

I also assume that wait times are generated via a First-Come-First-Served (FCFS) protocol, or that all veterans are treated identically in the queueing mechanism.[20] This is a much more substantive assumption, as it limits the extent to which wait times may be tailored to different veterans. VA medical professionals support the assumption as an approximation to reality in primary care, where prioritization is far less prevalent than in other settings.[21] Moreover, this view is supported by the data. Appendix Figure A.6 documents that the covariance between the clinic-level wait times and the characteristics of veterans choosing that clinic is robust to adjusting clinic-level wait times by residualizing of the composition of waiting patients. This indicates that patterns of heterogeneity are dominated by demand-side choices rather than supply-side prioritization.

[18] See https://data.dartmouthatlas.org/downloads/methods/geogappdx.pdf for more information.

[19] An HSA is finer geographic market that typically contains only a single hospital. There are 1,128 VA clinics in my sample.

[20] Specifically, within each quarter, I assume consumers randomly arrive to the market, observe the menu of waiting times at each clinic, and enter their most preferred queue.

[21] Patients are encouraged to seek other care (at other locations) if they face particularly urgent needs, rather than jump the queue.

Community Clinics I assume community clinics are un-capacity-constrained and provide care at constant marginal cost equal to Medicare Fee-For-Service rates. Community clinics therefore (1) provide care at zero wait times, and (2) accommodate any changes in patient demand as a result of VA policy changes. The first assumption is motivated primarily by data constraints: data on wait times at the VA are excellent, but extremely limited elsewhere. However, if community clinics have wait times that are non-zero, these will simply be incorporated in ξ_{jmt}. This assumption will not biases estimates, welfare calculations, or counterfactuals. The second assumption is reasonable as the VA population is small relative to each HRR's total population.

5.3 Equilibrium

Prices are regulated and the vector of VA wait times adjusts so that the following equilibrium condition holds:

$$\kappa_{jt} = \sum_i \frac{\exp\left(\mathbf{x}_{jt}\beta\left(\mathbf{z}_i\right) + \theta\left(\mathbf{z}_i\right) d_{ij} + \gamma\left(\mathbf{z}_i\right) w_{jmt} + \alpha\left(\mathbf{z}_i\right) p_{jmt} + \xi_{jmt}\right)}{1 + \Sigma_{j' \in \mathcal{J}_m} \exp\left(\mathbf{x}_{j't}\beta\left(\mathbf{z}_i\right) + \theta\left(\mathbf{z}_i\right) d_{ij'} + \gamma\left(\mathbf{z}_i\right) w_{j'mt} + \alpha\left(\mathbf{z}_i\right) p_{j'mt} + \xi_{j'mt}\right)} \tag{11}$$

for each $j \in \mathcal{J}_{mt}^{VA}$, or the set of VA clinics in each market at each point in time.

5.4 Estimation

Identification Two sources of endogeneity present a challenge to estimation of equation 10. First, $\mathbb{E}\left[w_{jmt}\xi_{jmt}\right] \neq 0$, as wait times are determined in equilibrium given demand shocks ξ_{jmt}. This is the classic simultaneity problem, which would lead to bias in $\gamma\left(\mathbf{z}_i\right)$. Despite the fact that prices are regulated, it is still likely that $\mathbb{E}\left[p_{jmt}\xi_{jmt}\right] \neq 0$. Absent the Choice Act, all variation in prices is across veterans who pay copayments versus those who do not and across VA and community clinics. Any unobservable differences in preferences across these veterans or unobservable differences across VA and community clinics will bias $\alpha\left(\mathbf{z}_i\right)$.

Following the logic of Section 4, I use the Choice Act policy variation to address both sources of endogeneity. First, the direct effect of the policy provides exogenous variation in p_{jmt} for community clinics. Specifically, letting superscripts VA and C denote VA and community care, respectively, I parameterize

$$\mathbf{x}_{jt}\beta\left(\mathbf{z}_i\right) = \beta^{VA}\left(\mathbf{z}_i\right) + \beta^{C}\left(\mathbf{z}_i\right) + \psi_o^{VA} + \psi_o^{C} + \chi_t^{VA} + \chi_t^{C} + \phi_j \tag{12}$$

where $\left(\beta^{VA}(\mathbf{z}_i), \beta^{C}(\mathbf{z}_i)\right)$ denote heterogeneous preferences for VA and community care, $\left(\psi_o^{VA}, \psi_o^{C}\right)$ capture differences in preferences across out-of-pocket payment classes for VA and community care, $\left(\chi_t^{VA}, \chi_t^{C}\right)$ denote time effects in preferences for VA and community care, and ϕ_j are clinic fixed effects. I assume that $\mathbb{E}\left[p_{jmt}\xi_{jmt} \,|\, \psi_o^{VA}, \psi_o^{C}, \chi_t^{VA}, \chi_t^{C}, \phi_j\right] = 0$, isolating only variation in prices from the Choice Act, similar to the difference-in-differences specification in Section 4.1. Figure 6 plots the variation in the price of community care over time across the out-of-pocket payment classes o. The baseline specification uses variation in prices from both the wait time and distance eligibility conditions of the Choice Act.

Second, I use the cross-clinic exposure to the Choice Act to instrument for wait times at VA clinics. Specifically, I assume that $\mathbb{E}\left[\mathbf{z}_{jt}\xi_{jmt}\right] = 0$, where $\mathbf{z}_{jt}$ are Choice eligibility instruments — exposure interacted with a post-policy indicator — as in Section 4.3.

Veteran-level variation in distance to each of the clinics in a market provides additional variation to identify heterogeneity in consumer preferences. Depending on where veterans are located relative to the menu of options, they face different trade-offs between prices, wait times, and other clinic characteristics. Under the additional assumption that $\mathbb{E}\left[d_{ij}\xi_{jmt}\right] = 0$, distance is an additional instrument to "trace-out" preferences over characteristics, wait times, and prices, without requiring functional form extrapolations beyond the support of Choice Act policy changes (Berry and Haile, 2022).

Selection In equation 10, wait times are treated like prices at the clinic-by-quarter level. In reality, wait times are a stochastic process with daily fluctuations due to the random arrival of veterans (Leshno, 2022; Ashlagi et al., 2022). Incorporating these day-to-day fluctuations is outside the scope of the model, however, it presents a potential selection problem in aggregation. If veterans are more likely to decline an appointment when arriving to the market on days with high wait times, measurement of w_{jmt} will be selected.

I address this using my supply-side model. If on any given day $\tilde{t}$ at any given provider, I observe no appointments being made, I assume that appointments made at date $\tilde{t}+1$ were available at date $\tilde{t}$. Appendix B provides more details; Appendix Figure B.1 recreates Figure 5, plotting the effects of the Choice Act on both raw means and this adjusted measure of wait times. Results are similar. I use this selection-adjusted measure of wait times in the estimation procedure described below.

Estimation Observable heterogeneity $\mathbf{z}_i$ includes veteran age bins, income bins (quartiles), priority group, lagged utilization bins (quartiles of total VA spending in the prior year), an indicator for past use of the VA to capture cross-system inertia, and the out-of-pocket payment class. Define $\mathbf{z}_{b(i)}$ as veteran i's unique cell based on observables. I subdivide the non-idiosyncratic component of utility into:

$$\underbrace{\mathbf{x}_{jt}\beta\left(\mathbf{z}_{0(i)}\right)+\chi_t^{VA}+\chi_t^{C}+\phi_j+\gamma\left(\mathbf{z}_{0(i)}\right)w_{jmt}+\alpha\left(\mathbf{z}_{0(i)}\right)p_{jmt}+\xi_{jmt}}_{\delta_{jmt}\text{: common to all in } jmt} \tag{13}$$
$$+\sum_b \underbrace{\beta^{VA}\left(\mathbf{z}_{b(i)}\right)+\beta^{C}\left(\mathbf{z}_{b(i)}\right)+\gamma\left(\mathbf{z}_{b(i)}\right)w_{jmt}+\alpha\left(\mathbf{z}_{b(i)}\right)p_{jmt}+\left(\theta\left(\mathbf{z}_{0(i)}\right)+\theta\left(\mathbf{z}_{b(i)}\right)\right)d_{ij}}_{\lambda_{ijmt}\text{: individual specific parameters}}.$$

I use the two-step estimation approach of Goolsbee and Petrin (2004). In the first step, I estimate the heterogeneity parameters in λ_{ijmt} via Maximum Likelihood, including fixed effects for δ_{jmt}. To ease computational constraints, I first estimate λ_{ijmt} on a random sample of markets and time periods, estimating λ_{ijmt} and δ_{jmt} jointly via Maximum Likelihood. Then, given $\hat{\lambda}_{ijmt}$, I loop over markets to estimate $\hat{\delta}_{jmt}$ by matching market shares exactly. In the second step, I estimate the parameters in δ_{jmt} via IV, using instruments for Choice exposure and variation in prices from the Choice Act. I estimate parameters on one pre-period year (2013) and one post-period year (2017), intended to capture the effect of the Choice Act after the ramp-up period documented in Figure 3. Estimation restricts to the sample of veterans dually enrolled in Traditional Medicare, where I observe the universe of choices in all time periods across VA and community care.

5.5 Estimates

No Heterogeneity Table 4 first presents results with no preference heterogeneity, estimating average preferences over prices and wait times.[22] Column 1 presents results from a panel regression, using *only* Choice Act variation in prices but *all* within-clinic variation in wait times, residualized of overall time trends in VA and community care. Column 1 documents a negative coefficient on price that implies an average elasticity of demand to a given clinic of -0.30. This estimate is slightly higher than price elasticities for individual hospitals estimated in Prager (2020) and outpatient utilization estimated in Chandra et al. (2010). These comparisons are reasonable given differences in setting and elasticities (clinic-level versus total utilization). The coefficient on wait times (γ) is positive and insignificant.

This is reversed in column 2, which instruments for w_{jmt} with deciles of Choice exposure interacted with a post Choice Act indicator (as in Section 4.3). When instrumented, γ becomes negative and significant. Table 4 illustrates that veterans are three times as elastic

[22]This has the advantage of estimating simple regression or 2SLS specifications using the inversion $\delta_{jmt} = \ln\left(s_{jmt}\right)-\ln\left(s_{0mt}\right)$ (Berry, 1994).

to wait times as to prices, at the prices and wait times in the sample. The difference between columns 1 and 2 underscores the endogeneity of wait times and the need for instruments. Column 3 uses a continuous interaction between exposure and the post Choice Act indicator and finds similar results, though slightly less precise.

Table 4 presents an estimate of the dollar cost of delay, $\frac{\gamma}{\alpha}$,[23] equal to approximately \$2.50. This means that average veteran would be willing to pay approximately \$2.50 to move an appointment at the same clinic one day sooner. This is a key estimate of interest: its magnitude governs the welfare costs of rationing with wait times, and its distribution governs the redistribution of surplus across rationing mechanisms.

With Heterogeneity Figure 7a plots the distribution of $\frac{\gamma(\mathbf{z}_i)}{\alpha(\mathbf{z}_i)}$, estimated with the two-step procedure described in Section 5.4, and documents substantial dispersion.[24] Appendix Table B.1 tabulates the underlying parameter estimates. Rationing by wait time, relative to prices, is favorable for those with a low cost of delay $\frac{\gamma(\mathbf{z}_i)}{\alpha(\mathbf{z}_i)}$. Figure 7b illustrates that the cost of delay is increasing in income: higher income veterans are willing to pay more to move an appointment one day sooner. The pattern on health status is slightly more mixed: the relationship between cost of delay and prior healthcare utilization is U-shaped, reflecting the fact that the sickest veterans find waiting particularly costly.

The patterns in Figure 7 relate to the patterns of screening in Section 4, which documented qualitatively similar screening patterns on the two instruments. Indeed, that is reflected in a positive correlation between $\alpha(\mathbf{z}_i)$ and $\gamma(\mathbf{z}_i)$, shown in Appendix Figure B.2. However, descriptive analyses are limited by the fact they do not compare waiting versus paying *directly*, which is necessary to obtain the marginal rate of substitution, $\frac{\gamma(\mathbf{z}_i)}{\alpha(\mathbf{z}_i)}$. This is obtained by the clinic choice model, which rationalizes veteran choices over the menu of possible clinics to estimate how veterans trade-off obtaining care at each clinic with waiting one more day, paying one more dollar, or traveling one more mile.

6 Waiting versus Paying and Policy Counterfactuals

I use my estimates to quantify the effects of allocating healthcare by wait times versus prices and the welfare effects of the Choice Act versus alternative policies. This analysis allows me

[23]This is $C(w)$ in the framework presented in Section 2.

[24]The approximately 38% of veterans who have no prior history at the VA (across all types of care) are completely inelastic on price; VA care and VA policy changes are likely not under consideration. I simply exclude them from exhibits in Figure 7 and counterfactuals, i.e. I assume that these veterans are inert to any policy changes at the VA.

to compare the effects of commonly used policies to manage high wait times to changes in the allocation mechanism itself.

6.1 Waiting versus Paying

I examine the allocative, efficiency, and distributional effects of the status quo rationing regime, where care is allocated via wait times at approximately zero prices, relative to a benchmark in which care can be obtained immediately with no waits, subject to a price. The price-based regime maximizes total welfare in dollars. It therefore serves as an efficient benchmark, though distinct distributional implications across rationing regimes may impact their desirability for a policymaker or social planner, as discussed in Section 2.

Counterfactuals hold total utilization at the VA constant and change the allocation mechanism. Specifically, for any given vector of VA wait times (prices), I search for a vector of prices (wait times) such that the equilibrium condition in equation 11 holds. There exists an infinite number of equilibria in different price and wait time combinations. I therefore fix one instrument and search for another, yielding a $\mid \mathcal{J}_{mt}^{VA} \mid$ -dimensional system of equations with a $\mid \mathcal{J}_{mt}^{VA} \mid$-dimensional vector of unknowns for each market. To compare allocating with wait times versus prices, I simulate counterfactual outcomes over the entire analysis period.

I restrict to the population of Traditional Medicare dual-eligibles for whom preferences are estimated. The focus on this large sub-population is unlikely to change the qualitative conclusions. Over three-quarters of veterans have alternative sources of insurance coverage, and demographics and VA utilization are similar across the Traditional Medicare sub-population and the population overall (see Table 1).

Equilibrium Allocations and Revenue Table 5 presents results. Column 1 presents wait times, prices, and allocations under the status quo waiting-based regime, and column 2 presents these same outcomes while imposing zero waits and instead allowing prices to flexibly adjust in response to demand and capacity constraints κ_{jt}. Interpretation of Table 5 requires that estimates accurately describe the choices that veterans make, but does not require a normative assumption that choices reveal value.

Table 5 illustrates that prices of \$78 (at the median clinic) would be required to achieve zero wait times, about 20% of the cost of a VA primary care visit. \$78 is larger than any outpatient copayments at the VA, with a maximum of \$50 for specialty care for certain veterans. Though the costs of waiting (41 days at the median clinic) are substantial, these costs are not collected as revenue, as would the \$78 under the counterfactual price regime.

Table 5 also demonstrates substantial allocative effects. Slightly fewer veterans obtain any care at all under the price regime than under status quo wait times. This adjusts, despite strict capacity constraints at the VA, because of the opportunity to substitute to either community or no care. 4% of all veterans receiving care under the status quo are displaced out of any care, and 16% are displaced out of VA care, with an equivalently sized, but differing composition of veterans substituting in.

Table 5 panel C describes the distributional effects of these alternative allocations by tabulating the characteristics of veterans obtaining care. The average consumer receiving VA care under the status quo wait time rationing regime (column 1) is 5% lower income, 4% sicker, and 1% older than those who would obtain care under the price regime (column 2). These patterns persist, though muted, for the characteristics of veterans receiving any care at all. These results thus present a trade-off, perhaps offering an explanation for varied use of these two regimes around the world. The price regime allocates scarce healthcare capacity to those who value it, while generating revenue, but the wait time regime redistributes access to care to lower socio-economic status individuals.

Welfare Whether consumer surplus is higher under wait times versus prices is ambiguous. Table 6 quantifies it, and documents that consumer surplus is $57.25 lower (per veteran, per year) under the status quo wait time regime versus the price regime. 60% of this effect is due to allocative inefficiency, an unambiguous loss as the veterans with the highest willingness to pay do not always obtain care when it is rationed by wait times. A further 40% loss is due to differential screening costs among inframarginal veterans. Effects on screening costs are ambiguous but empirically lower under the wait time regime because waiting is more costly for inframarginal veterans than for the marginal veteran. Waiting is differentially costly for sicker veterans who are also more likely to have a high value for VA care, or the $C(w^*)$ curve in Figure 1 is upwards- not downwards-sloping.

An additional $62.90 per veteran, per year is further lost from a lack of recouped revenue. Waiting is social waste; costs are borne by veterans but not transferred. Together, the combined efficiency cost of the status quo rationing regime is $120 per veteran per quarter, or 23% of achievable surplus.

Evaluating Trade-Offs As highlighted in Table 5, there are winners and losers. Table 6 splits the sample by veterans who have higher consumer surplus under the status quo wait time regime, relative to the price regime (column 2) and vice versa (column 3). Although consumer surplus is on average over $57 lower, *more than half* of veterans (55%) *prefer* the status quo wait time regime to the price-based alternative. Mirroring the results in Table 5 and Figure 7, those who prefer the status quo rationing regime are poorer, sicker, and older.

Comparing the average consumer surplus gain ($18.37), among the 55% who prefer the status quo wait time regime, to the average consumer surplus loss ($150.46), among those who prefer the alternative, illustrates the magnitude of a trade-off between efficiency and distributional concerns. This comparison highlights that over $5 of consumer surplus is destroyed to transfer $1 from status quo losers (column 3) to status quo winners (column 2). To put this in perspective, a $5 cost is over twice as large as the cost of transferring $1 from the richest to the poorest person through the income tax schedule (Hendren, 2020). However, this analysis is incomplete; it ignores the difference in revenue across the two regimes.

Figure 8 plots the percent of veterans who continue to prefer the status quo wait time regime, relative to the price regime, *after redistributing revenue* uniformly to the veteran population. Figure 8 varies the percent of revenue that is redistributed from 0 to 100%. With only 50% of revenue redistributed, only 10% of veterans prefer status quo waiting. This number drops to 5% and 3%, respectively, under 75% and 100% redistribution of revenue. Even with only uniform transfers, the lost revenue is substantial relative to the magnitude of expected welfare differences, so the planner can achieve close to a Pareto improvement.

This underscores the importance of considering revenue-generating mechanisms in the set of screening instruments available to a social planner. The classic idea of Nichols and Zeckhauser (1982) is that an ordeal can potentially better target individuals. The relevant empirical question not only of whether the ordeal achieves more favorable targeting than an alternative mechanism, but whether this favorable targeting outweighs both the costs of the ordeal to individuals *and* losses in revenue.

Discussion The analyses above highlight that the redistribution of surplus is small relative to the total efficiency costs of rationing by waiting. Two key patterns in the data drive this conclusion. First, prices and wait times screen on qualitatively similar dimensions, as seen in Section 4. Therefore, wait times generate substantial deadweight loss without a sufficiently large redistribution of surplus. Second, waiting costs for inframarginals are high, yielding large deadweight losses among veterans whose care is otherwise unaffected.

6.2 The Choice Act versus Alternative Policies

Given the ubiquity of rationing by wait times in practice and estimates from the preceding section that this is quite costly, how effective are policies like the Choice Act at managing these costs? The welfare effects of the Choice Act are ambiguous based on the results in Section 4: wait times decreased and healthcare utilization increased, but spending increased as well. Using estimates of preferences and data on VA and community care costs, Table 7 quantifies the welfare effects of the Choice Act and alternative policies, relative to the status quo without the Choice Act. Table 7 presents changes in consumer surplus, net government revenue, and their sum.

The Choice Act and Eligibility Expansions Table 7 column 1 shows that the Choice Act *decreases* social welfare. While the Choice Act unambiguously increases consumer surplus — both directly eligible and ineligible veterans are better off — this increase does not outweigh the increase in costs. Expansions in Choice Act eligibility, both factual in 2018 under the MISSION Act and counterfactual expansions to everybody, have the same effect.

The Choice Act and similar expansions of subsidized community care increase costs more than gains in consumer surplus for two reasons. First, the marginal veteran obtaining care at the VA is only willing to pay 20% of the cost of care (Table 5), so the reduction in wait times increased the difference between the private and social costs of seeking VA care. Put differently, there *is* sufficient capacity at the VA but an *inefficient mechanism* to allocate it. The Choice Act addressed the former, not the latter. Second, the Choice Act is poorly targeted: veterans receive the same subsidy for community care, regardless of their externality on others using the VA (as in Diamond (1973)). Veterans are treated identically by the policy regardless of whether they substitute away from the VA, and generate a positive externality from reducing congestion, or from no care, which has no such positive externality. As Figure 3 documents, for every veteran that substitutes away from the VA and alleviates congestion, one veteran substitutes from the outside option, increasing spending by more than their value of the service.

While quantitative conclusions are specific to this setting, the analysis offers broader lessons to health policy designers implementing similar programs to reduce public sector congestion. Policies that increase prices directly on the congested public option may be more effective than Choice Act-style subsidies for private care.

Targeted Copayment Increases Table 7 column 4 evaluates a small, targeted copayments increase at the VA, increasing copayments from \$15 to \$50 for only the one-third of veterans who already pay copayments.[25] This group of veterans is on average substantially

[25] In 2001, copayments for primary care were decreased from slightly over \$50 to \$15; this counterfactual could be interpreted as a reversal of that policy.

higher income than the veterans who are not obligated to pay copayments ($44,127 versus $23,120). This targeted copayment increase raises average consumer surplus by substantially more than the Choice Act, despite *increasing prices* for some veterans. This occurs because a price increase at the VA is much more effective at reducing VA wait times that subsidizing the alternative. Because copayments are targeted at higher socio-economic status veterans, the copayment policy disproportionately benefits low-income veterans. Moreover, it generates revenue, rather than increasing costs.

Targeted copayment increases can raise welfare substantially while satisfying distributional objectives. Relaxing price controls can thus generate larger gains than alternatives policies that maintain them, while attempting to manage the resulting wait times.

7 Conclusion

This paper studies the efficiency and distributional consequences of healthcare rationing mechanisms used in practice — wait times versus prices — and analyzes policy in the presence of price controls and capacity constraints. I leverage the rich data and policy environment of the VA and combine quasi-experimental variation with an equilibrium model to illustrate welfare trade-offs and evaluate policy counterfactuals.

I document that the Choice Act increased access to care via both reductions in prices for eligible veterans and wait times in equilibrium. To evaluate the efficiency and distributional consequences of the rationing mechanisms of interest, I use this variation to estimate a model of clinic choice and queuing for primary care. Although there exists a trade-off between efficiency and distributional consequences, allocating healthcare via wait times leads to large efficiency costs. Because of this, small copayment increases substantially improve upon the Choice Act policy.

Many healthcare systems across the globe have eliminated financial barriers to care. However, in the presence of capacity constraints, other barriers, typically wait times, often emerge. Empirically evaluating the distinct consequences of prices versus wait times is essential to understanding whether this choice is advantageous or detrimental to a policymaker's goals. The results in this paper suggest that rationing via wait times imposes efficiency costs that likely substantially hinder a policymaker's objectives. Investigating the performance of other allocation mechanisms in healthcare contexts presents an exciting avenue for future research

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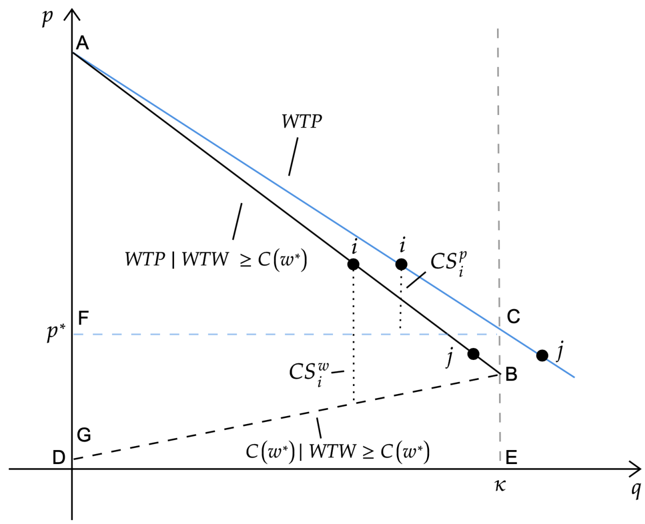
Tables and Figures

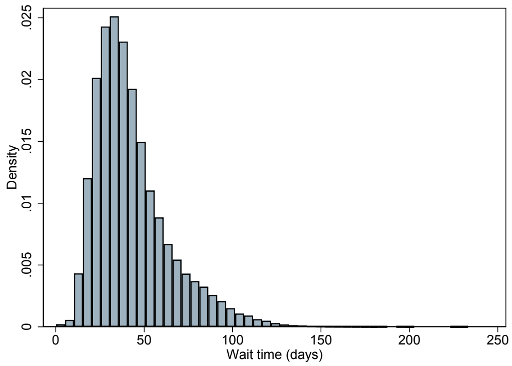
Figure 1: Conceptual Framework: Graphical Illustration



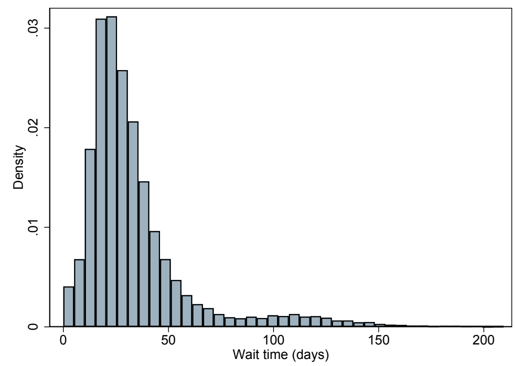
Notes: Figure presents a graphical illustration of the efficiency and possible distributional implications of allocating healthcare with prices versus wait times. The area between curves AC and AB represents the allocative efficiency loss from rationing by waiting, relative to prices. The curve GB calculates the average cost of waiting at each point along the curve AB. The area underneath the curve GB represents the deadweight loss from waiting. Example individual j switches from obtaining no care under the price regime to obtaining care under the wait time regime. Example individual i obtains care under both but achieves different levels of consumer surplus, CS_i. κ represents available capacity, taken as given. These curves are simply examples for illustration: the curve $C(w^*)$ could be upward sloping, flat, or non-monotonic and the curves AC and AB could lie closer to or further from each other.

Figure 2: Clinic-Level Summary Statistics

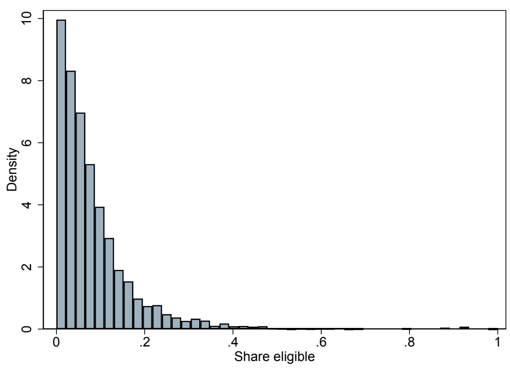
(a) Wait Times (Days), All Specialties



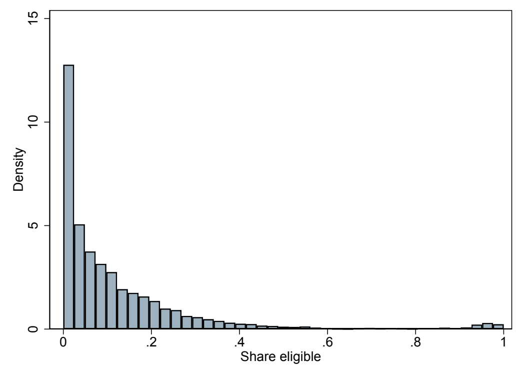
(b) Wait Times (Days), Primary Care



(c) Choice Act Exposure



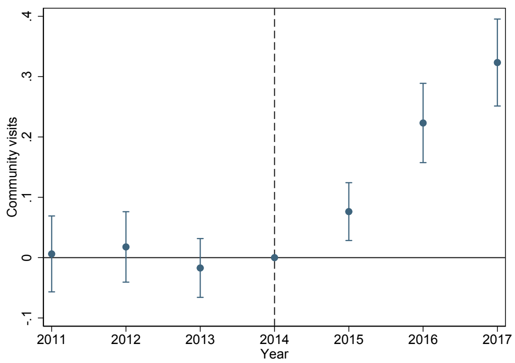
(d) Choice Act Exposure, Primary Care



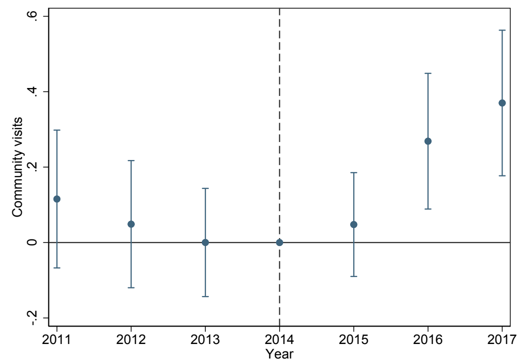
Notes: Figure presents histograms of average wait times and Choice Act exposure for all outpatient specialties and primary care, both calculated in the pre-Choice (2011-2014) period. Wait times are calculated as the average time between the request date and visit date among all appointments (completed or cancelled) in a clinic in a quarter. Exposure is calculated as the share of visits in a clinic and specialty for which the patient is distance eligible (lives over 40 miles from their closest clinic or in a state without a VA hospital) or wait-time eligible (has a wait time, based on the patient's desired or clinically indicated date, of over 30 days). Sample includes 1,128 clinics.

Figure 3: The Effect of Choice Act Eligibility on Utilization

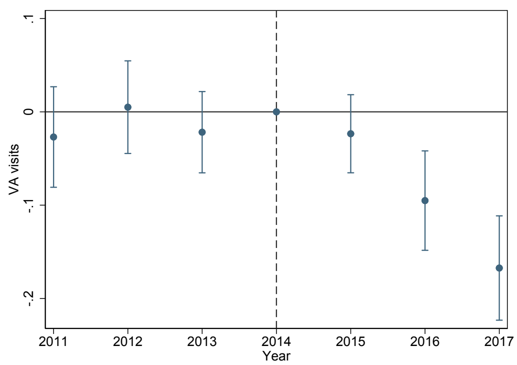
(a) VA-Financed Community Visits



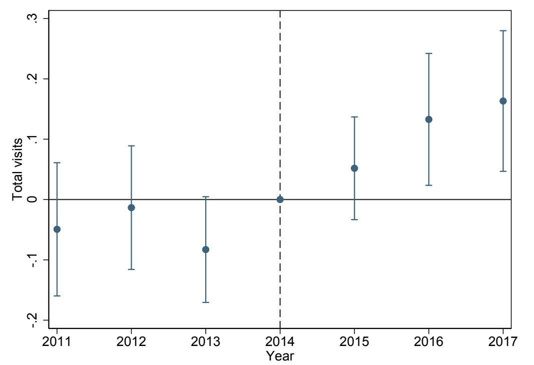
(b) All Community Visits



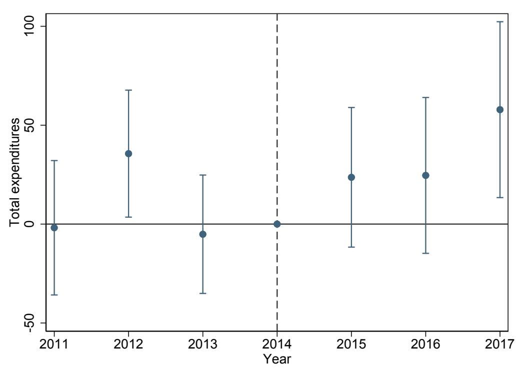
(c) VA Visits



(d) Total Visits (VA + Community)



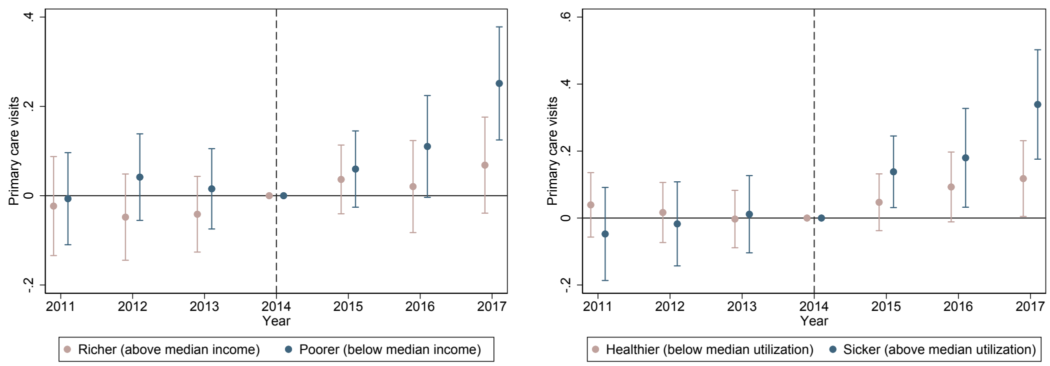
(e) Total VA Spending



Notes: Figure presents event study coefficient estimates from equation 4. In sub-figure (a) the outcome is all community outpatient visits per year, estimated on the whole sample. In sub-figure (b), I restrict to the population of veterans dually eligible for Traditional Medicare, where I observe and plot all community utilization. Sub-figures (c), (d), and (e) plot VA visits, total visits (VA + community), and total VA spending in the whole sample, respectively. Total VA spending is calculated based on per-visit cost estimates produced by HERC and claims for VA-financed community care. Estimates restricted to veterans living 10 miles from the 40-mile eligibility threshold.

Figure 4: Heterogeneous Responses to the Choice Act Subsidy

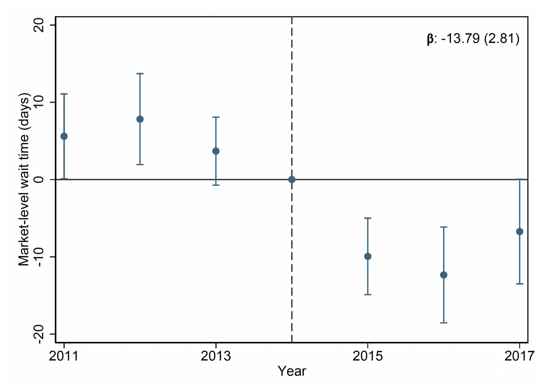
(a) Community PC Visits, by Income (b) Community PC Visits, by Health Status



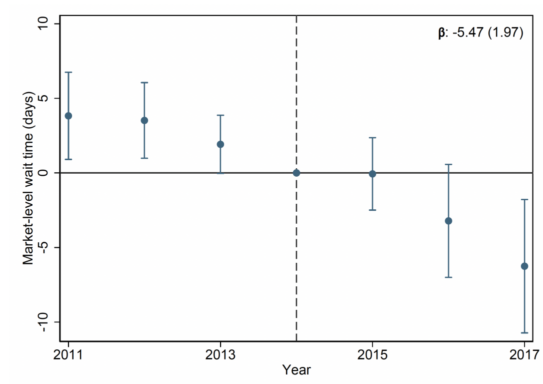
Notes: Figure presents event study coefficient estimates from equation 4 with the outcome equal to community primary care (PC) visits, split by whether a veteran is above versus below median income (a) and health status (b), where health status is measured by total VA spending in the prior year. The sample is restricted to a sub-set of veterans who face the same prices: Traditional Medicare enrollees without a Medigap plan. Sample restricted to enrollees living within a 10 mile window of the 40 mile threshold.

Figure 5: The Effect of Choice Exposure on Wait Times

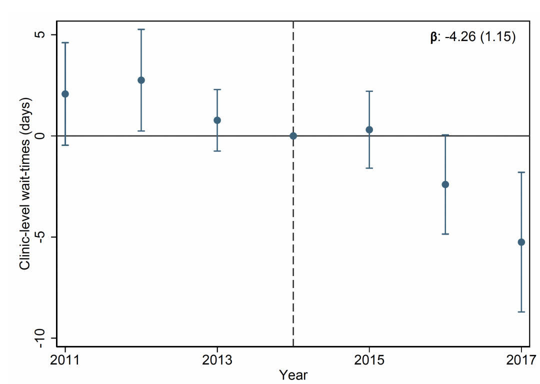
(a) HRR-by-Specialty Level



(b) HRR-Level, Primary Care

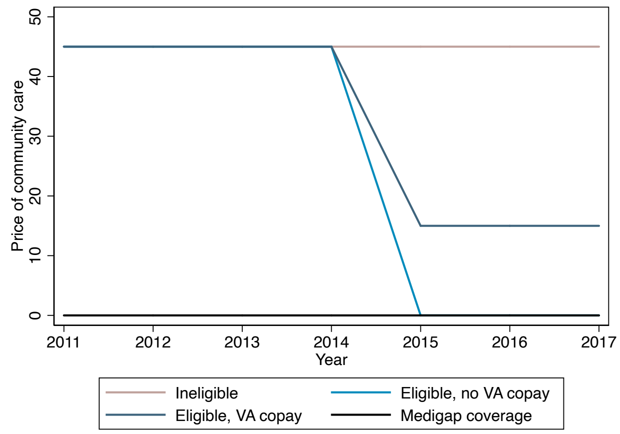


(c) Clinic-Level, Primary Care



Notes: Figure presents event study coefficient estimates from equation 6 with pooled difference in-differences estimates (from equation 7) presented on the graph with standard errors clustered at the market-by-specialty (a), market (b), or clinic (c) level. Sub-figure (a) calculates effects on wait times across all HRRs and specialties, sub-figure (b) calculates effects on wait times at the HRR level for primary care only, and sub-figure (c) calculates effects on wait times at the clinic-level. Coefficients are scaled to represent a move from the 10th to the 90th percentile in the pre-period share eligible distribution.

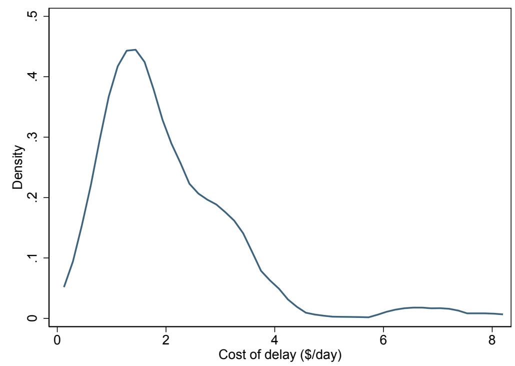
Figure 6: Variation in Prices



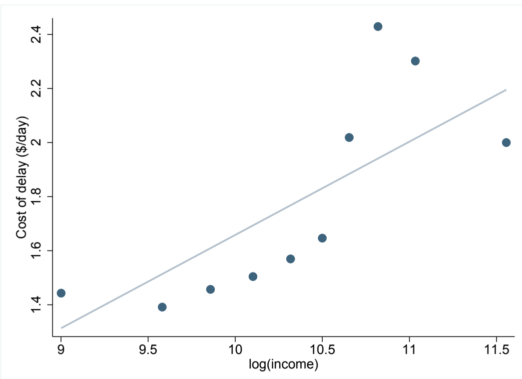
Notes: Figure presents variation in prices for community care among the different out of pocket payment classes for the Traditional Medicare (TM) sample. The out of pocket price for TMs without Medigap is calculated as the median out of pocket payment for primary care. Medigap prices are set to zero because the vast majority of Medigap policies held by VA enrollees include no outpatient cost-sharing. Veterans report Medigap plan information to the VA.

Figure 7: Distribution of the Cost of Delay

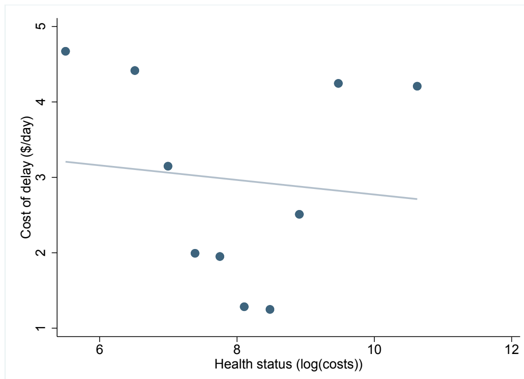
(a) Kernel Density Plot



(b) Correlation with Income

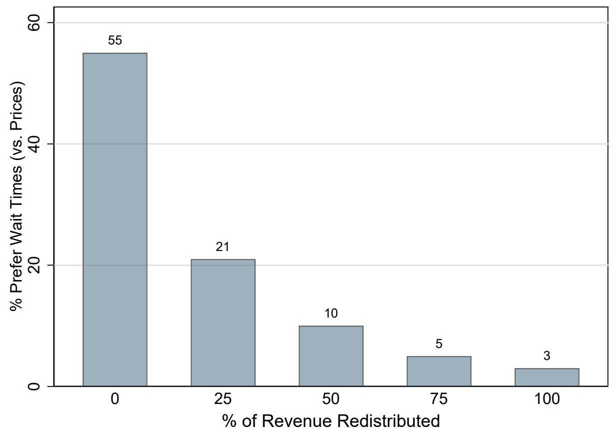


(c) Correlation with Health Status (Costs)



Notes: Figures summarize estimates of $\frac{\gamma(\mathbf{z}_i)}{\alpha(\mathbf{z}_i)}$, based on the two-step estimation procedure described in Section 5.4 using variation in prices from the Choice Act and instruments for wait times equal to deciles of Choice Act exposure interacted with a post Choice Act indicator. Sub-figure (a) plots a kernel density plot of $\frac{\gamma(\mathbf{z}_i)}{\alpha(\mathbf{z}_i)}$, or the cost of delay. Sub-figures (b) and (c) correlate $\frac{\gamma(\mathbf{z}_i)}{\alpha(\mathbf{z}_i)}$ with log income and log lagged VA costs (a proxy for health status) in binned scatterplots. I exclude veterans who do not engage with the VA at all (i.e. zero total utilization) in the preceding year.

Figure 8: Percent Who Prefer Wait Times after Revenue Redistribution



Notes: Figure presents the percent of veterans who are better off under the status quo wait time regime after accounting for redistributed revenue, varying the percent of revenue that is redistributed. Revenue is uniformly redistributed lump-sum. Percent who prefer wait times is the percent of the population for whom the difference in consumer surplus under the status quo wait time regime relative to price counterfactual, net of each veteran's share of revenue collected under the price regime, is positive.

Table 1: Veteran-Level Summary Statistics

	All	Dually-eligible for TM	Distance-eligible for Choice	Not distance-eligible for Choice
	(1)	(2)	(3)	(4)
Panel A. Veteran characteristics				
Age	61.9	73.2	63.9	61.7
	(17.1)	(10.7)	(16.2)	(17.2)
Share male	0.927	0.970	0.944	0.925
Income	36,862	39,070	35,000	37,033
	(29,638)	(29,138)	(27,294)	(29,838)
Share paying copays	0.293	0.348	0.289	0.294
Share with any supplemental insurance	0.758	1.000	0.779	0.756
Share with Traditional Medicare	0.361	1.000	0.452	0.353
Panel B. Annual utilization				
VA spending	5,148	6,207	4,714	5,188
	(18,726)	(22,007)	(16,073)	(18,945)
VA outpatient visits	7.54	8.46	6.25	7.66
	(13.96)	(14.54)	(11.12)	(14.20)
Total outpatient visits	12.15	19.17	12.03	12.16
	(24.02)	(30.82)	(22.39)	(24.17)
VA primary care visits	1.02	1.15	1.03	1.02
	(1.61)	(1.70)	(1.55)	(1.62)
Total primary care visits	2.31	4.38	2.49	2.29
	(4.89)	(6.29)	(5.12)	(4.86)
Share with both VA and non-VA primary care visit				
In same year	0.114	0.244	0.149	0.110
Ever	0.311	0.512	0.403	0.303
N enrollees	11,329,529	5,231,539	1,274,957	10,619,494
N enrollee-years	64,944,118	23,458,147	5,420,656	58,756,964

Notes: Table presents summary statistics from the veteran enrollee sample from 2011-2017. Column (1) includes all veterans, column (2) includes only veterans who are dually eligible for Traditional Medicare, for whom I observe all of their community utilization, column (3) includes only veterans whose home address is over forty miles from the closest VA clinic, and column (4) includes veterans who live closer than forty miles from their VA clinic. Income is averaged across all means-tests conducted from 2000-2019 and presented in 2015 USD. VA spending tabulates all spending by the VA per veteran-enrollee-year. Outpatient visits and primary care visits tabulate the number of outpatient and primary care encounters per veteran enrollee-year at the VA, and across VA and community care (total).

Table 2: Coefficient Estimates: Direct Effects

	All		TM dual eligibles sample	
	2014 mean	Coefficient estimate	2014 mean	Coefficient estimate
	(1)	(2)	(3)	(4)
Panel A. Utilization				
Community visits (all)	5.475	0.235	10.457	0.177
		(0.033)		(0.067)
Community spending (VA-financed)	302.25	69.85	346.77	67.37
		(5.52)		(9.40)
Visits at VA clinics	6.181	-0.082	6.861	-0.086
		(0.020)		(0.031)
RVUs as VA clinics	1779.26	-26.92	1981.03	-20.71
		(8.50)		(14.42)
Spending at VA clinics	2440.32	-42.03	2696.07	-32.99
		(11.51)		(18.36)
Total visits (VA + community)	11.69	0.150	17.32	0.091
		(0.041)		(0.076)
Total VA-financed spending	2742.57	27.82	3042.83	34.38
		(13.35)		(21.59)
Panel B. Clinic characteristics				
Wait time	38.53	-2.25	41.19	-2.65
		(0.10)		(0.15)
Distance (miles)	54.12	-1.28	54.36	-1.15
		(0.06)		(0.08)

Notes: Table presents coefficient estimates from equation 5, for the whole sample (column 2) and for the Traditional Medicare (TM) sample (column 4) for whom the universe of community utilization is observed. Columns 1 and 3 present the year -1 (2014) mean for the distance-eligible veterans in each sample. Community visits (all) indicate all visits at non-VA providers across VA and Medicare financing. Community spending (VA-financed) indicates community spending that is VA (not Medicare) financed. RVUs at VA clinics is a measure of utilization in which procedures are weighted identically to Medicare. VA spending is attributed to specific visits from accounting data by HERC. Total visits (VA + community) captures all visits at VA and non-VA providers across VA and Medicare financing. Total VA financed spending includes all VA spending across VA clinics and community care. Wait time and drive time indicate the average wait time and drive time veterans experience conditional on receiving any care, across VA and community options, where community wait times are calculated based on the time between authorization and visit, and VA wait times are calculated as described in the main text. Robust standard errors in parenthesis clustered at the veteran level. All utilization outcomes are for outpatient care.

Table 3: Heterogeneous Responses to Wait Times

		By income		By health status	
	All	Poorer (below median)	Richer (above median)	Sicker (above median costs)	Healthier (below median costs)
	(1)	(2)	(3)	(4)	(5)
Coefficient estimate	-0.008	-0.010	-0.008	-0.012	-0.008
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)

Notes: Table presents coefficient estimates of the clinic-level 2SLS specification in equation 8 for everyone, split by below vs above income, and below versus above median prior VA costs (as a proxy for health status). The dependent variable is the log of the market share of each clinic among Choice-ineligible veterans in a given demographic group. Market shares calculated using HRRs as market definitions. Instruments are deciles of Choice Act exposure interacted with a post Choice Act indicator. First stage F-statistic = 16. Regressions are weighted by the market size of each demographic group across HRRs. Robust standard errors in parenthesis.

Table 4: Parameter Estimates: No Heterogeneity

	$\delta_{jmt} = \ln(s_{jmt}) - \ln(s_{0jmt})$		
	OLS	IV deciles exposure	IV continuous exposure
	(1)	(2)	(3)
γ : coefficient on wait time	0.0004	-0.0198	-0.0194
	(0.0003)	(0.0021)	(0.0052)
α : coefficient on price	-0.0079	-0.0079	-0.0079
	(0.0004)	(0.0004)	(0.0004)
$\frac{\gamma}{\alpha}$: cost of delay (\$/day)	-0.05	2.52	2.47
	(0.04)	(0.29)	(0.67)
Clinic fixed effects (ϕ_j)	✓	✓	✓
Time fixed effects for VA and community care $\left(\chi_t^{VA}, \chi_t^{C}\right)$	✓	✓	✓
Average elasticity w.r.t. w	0.017	-0.932	-0.914
Average elasticity w.r.t. p	-0.296	-0.294	-0.294

Notes: Table presents parameter estimates from the following regression: $\ln(s_{jmt}) - \ln(s_{0jmt}) = \psi_o^{VA} + \psi_o^{C} + \chi_t^{VA} + \chi_t^{C} + \phi_j + \gamma w_{jmt} + \alpha p_{jmt} + \xi_{jmt}$. Variation in prices comes from the Choice Act. In column 1, I use all residual variation variation in wait time. In column 2, I instrument for wait time using the interaction between deciles of Choice Act exposure share and a post Choice Act indicator (first stage F-statistic = 43). In column 3, I instead use a continuous interaction (first stage F-statistic = 69). Figure 5 provides a visual representation of the the first stage. Elasticities are calculated for each clinic with non-zero prices or wait times. Robust standard errors in parenthesis. Standard errors on the cost of delay calculated via the delta method.

Table 5: Counterfactuals: Status Quo Wait Times versus Market-Clearing Prices

	Status quo wait regime (1)	Price regime (2)
Panel A. Prices and wait times		
Median clinic wait (VA)	40.84	0
Median copay charged (VA)	5.04	78.41
as a share of cost of service	0.01	0.20
Panel B. Changes in allocations		
Obtained care in quarter	0.42	0.41
Share displaced relative to s.q.		
out of VA care		0.16
out of any care		0.04
Panel C. Characteristics of veterans receiving care		
VA care		
Log income	10.30	10.35
Log health costs	8.36	8.32
Age	71.49	70.75
Any care		
Log income	10.63	10.64
Log health costs	7.91	7.90
Age	74.75	74.56

Notes: Table presents status quo (column 1) and counterfactual (column 2) prices, wait times, and allocations, spanning the pre-Choice and post-Choice period. In column 2, I search for a vector of VA prices to satisfy equation 11 with no wait times, keeping total VA utilization constant. Wait times and prices vary across clinics and time based on excess demand; Table reports the median. Panel C reports the average characteristics of consumers served at the VA, and at all, including VA and community care, under the two regimes.

Table 6: Welfare: Status Quo Wait Times versus Market-Clearing Prices

	Δ: status quo (waiting) - price regime		
	All	$\Delta CS > 0$	$\Delta CS < 0$
	(1)	(2)	(3)
Δ consumer surplus ($ per veteran, per year)	-57.25	18.37	-150.46
From change in allocation	-34.28		
From change in screening costs	-22.98		
Revenue	-62.90		
Total difference in welfare	-120.15		
As a share of total surplus (%)	23		
Pop share		0.55	0.45
Log income		10.23	10.58
Log health util		8.05	7.89
Age		73.77	71.67

Notes: Table presents changes in welfare per enrollee, per year from the status quo rationing regime, relative to a counterfactual equilibrium in which VA care can be obtained immediately with no wait, at a price per clinic to satisfy equation 11 (the counterfactual presented in column 2 of Table 5). Column 1 presents changes in consumer surplus, decomposed into changes in allocative efficiency and changes in screening costs, and revenue. Columns 2 and 3 split the sample into those who prefer the status quo wait-time rationed regime (column 2) and those who prefer the price regime (column 3), based on expected consumer surplus, and presents average consumer surplus and characteristics among those two groups.

Table 7: Policy Counterfactuals: The Choice Act versus Alternatives

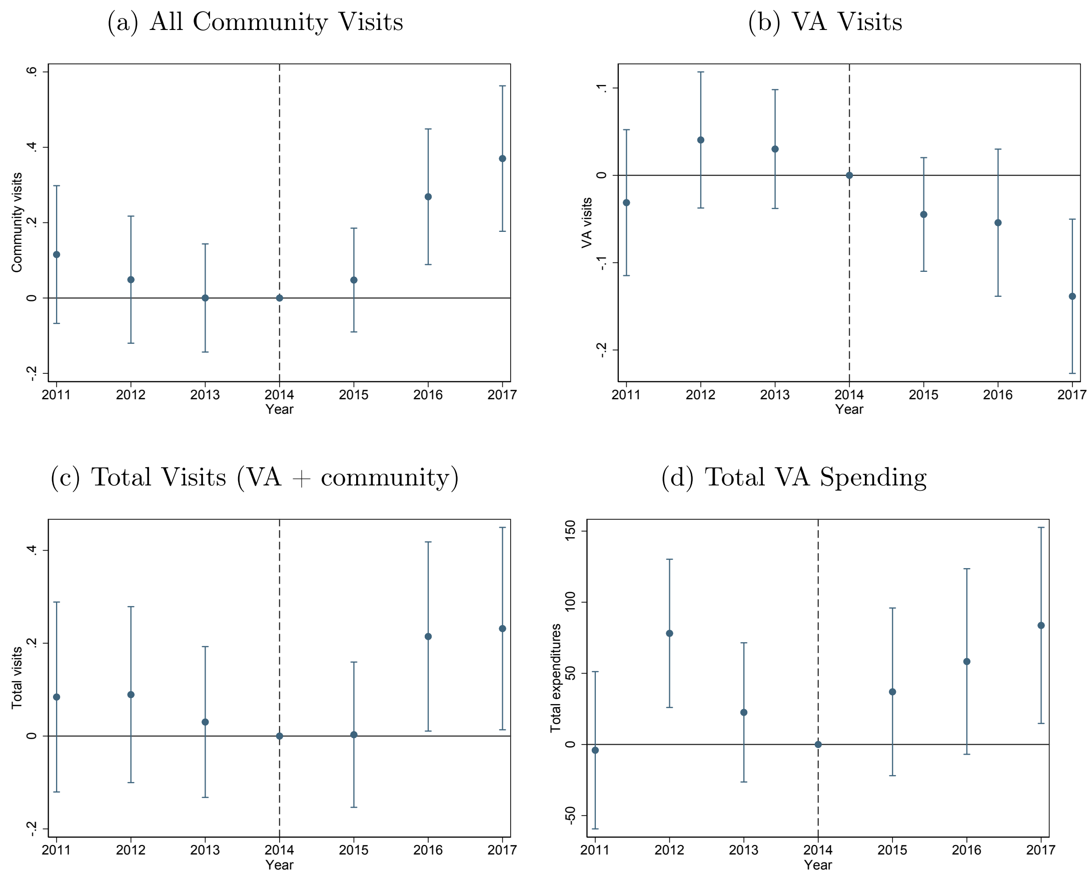
	Choice Act	Expand to MISSION	Expand to everyone	Copay $\uparrow$ from $15 to $50
	(1)	(2)	(3)	(4)
Differences relative to the no Choice Act status quo				
Δ CS ($ per veteran, per year)	1.93	4.28	7.63	11.50
Δ Revenue - Costs	-3.77	-9.00	-14.18	2.90
Δ Social Welfare	-1.84	-4.72	-6.56	14.40

Notes: Table presents consumer surplus, government revenue net of costs, and total welfare (adding CS and revenue) under factual and counterfactual policies, relative to the no Choice Act status quo. Column 1 presents the welfare effects of the Choice Act, column 2 considers the expansion in eligibility requirements under the MISSION Act of 2018 (115th Congress, 2018), and column 3 evaluates a counterfactual policy under which everyone is eligible for Choice Act subsidies. Column 4 increases VA copayments from $15 to $50 for veterans who are obligated to pay copayments.

A Additional Analyses of the Choice Act

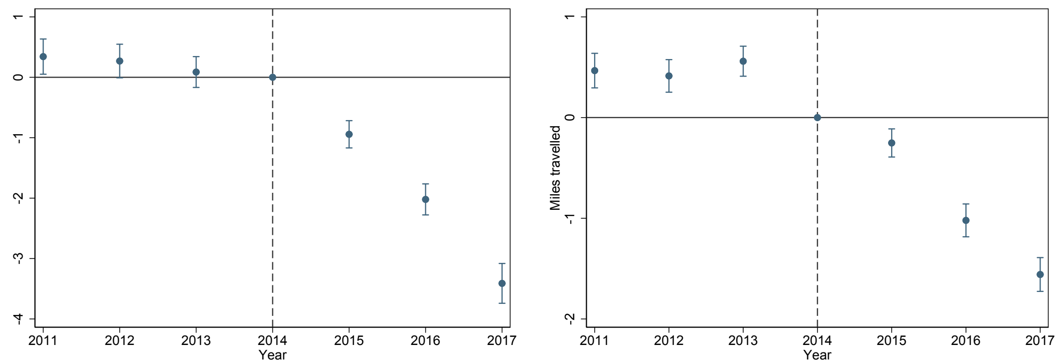
A.1 Robustness and Additional Results

Figure A.1: The Effect of Choice Act Eligibility on Utilization, TM Sample



Notes: Figure presents event study coefficient estimates from equation 4, estimated on on the Traditional Medicare (TM) sample. In sub-figure (a) the outcome is all community outpatient visits per year. Sub-figure (b), (c), and (d) plot VA visits, total visits (VA + community), and total VA spending. Total VA spending is calculated based on per-visit cost estimates at the VA from HERC and claims for VA-financed community care. Estimates restricted to a sample living 10 miles from the 40 mile eligibility threshold.

Figure A.2: The Effects of Choice Act Eligibility on Characteristics of Chosen Clinics

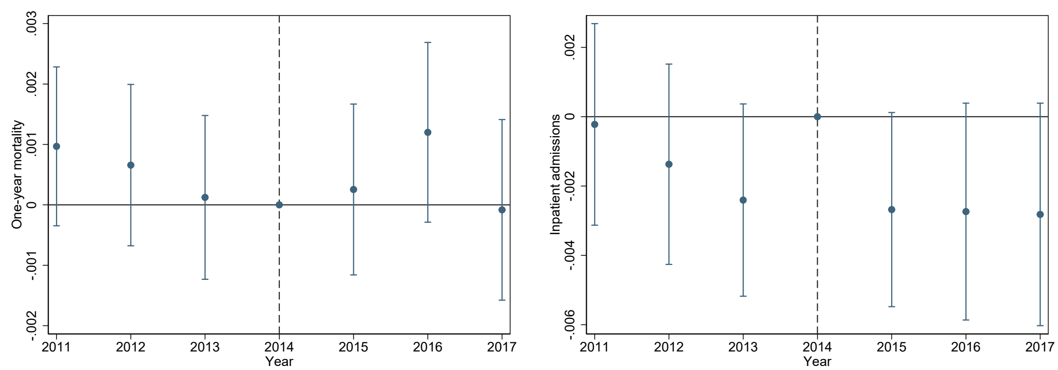


(a) Wait Times of Chosen Clinics

(b) Distance to Chosen Clinics

Notes: Figures present event study coefficients from equation 4 with the outcomes equal to the average wait time (a) and travel distance (b) at the VA and across VA and community care. Wait times at community care are determined by the time between the authorization for community care and the date of the visit. Wait times for VA visits are calculated as described in the main text. Effects estimated on the whole sample of enrollees living 10 miles from the 40 mile eligibility threshold.

Figure A.3: Effects of Choice Eligibility on Health Outcomes



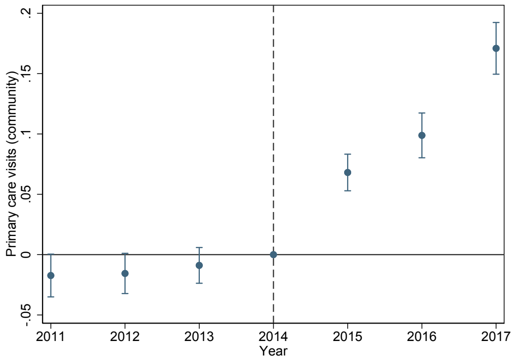
(a) Mortality

(b) Inpatient Admissions

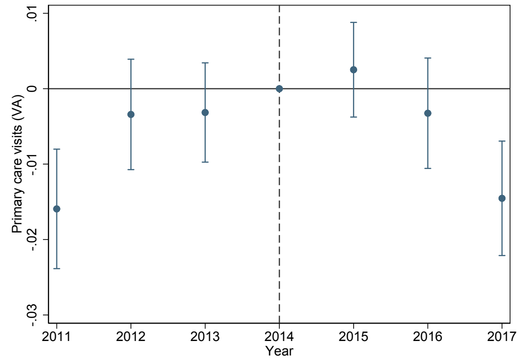
Notes: Figures present event study coefficients from equation 4 with the outcomes equal to an indicator for whether the veteran died that year (a) and the number of inpatient admissions (b). Effects estimated on all veterans alive as of 2014 living 10 miles from the 40 mile eligibility threshold.

Figure A.4: The Effect of Choice Eligibility on Primary Care Utilization

(a) Community visits: primary care

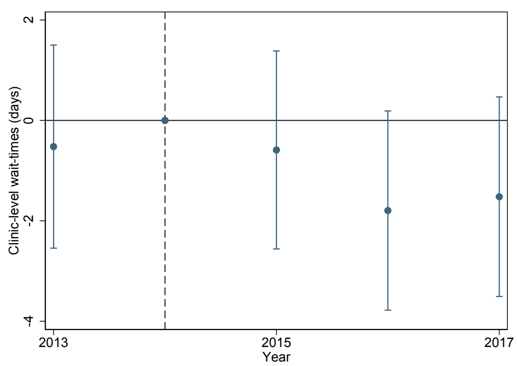


(b) VA visits: primary care



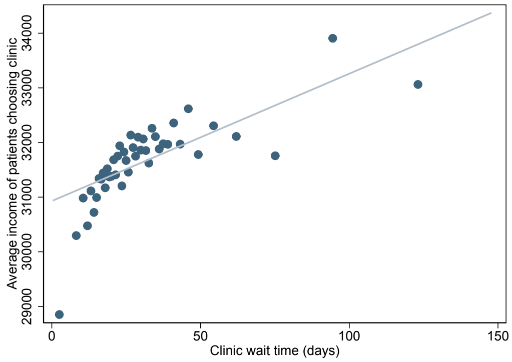
Notes: Figure presents event study coefficient estimates from equation 4 for primary care utilization. In sub-figure (a) the outcome is all community primary visits per year, and in sub-figure (b) it is all VA primary care visits. Effects estimated on the whole sample of enrollees living 10 miles from the 40 mile eligibility threshold.

Figure A.5: Equilibrium Effects: New Patient Wait Times

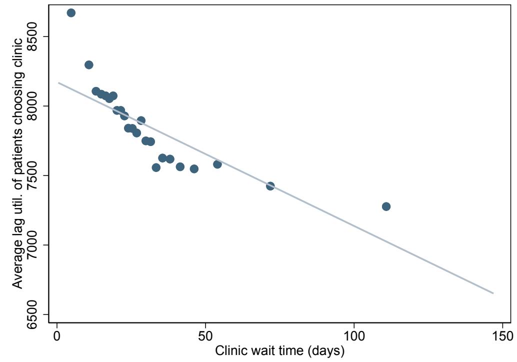


Notes: Figure replicates Figure 5c, calculating wait times only for new patients. The figure excludes 2011 and 2012 because patients are defined as new based on having no visits in a two-year look back period.

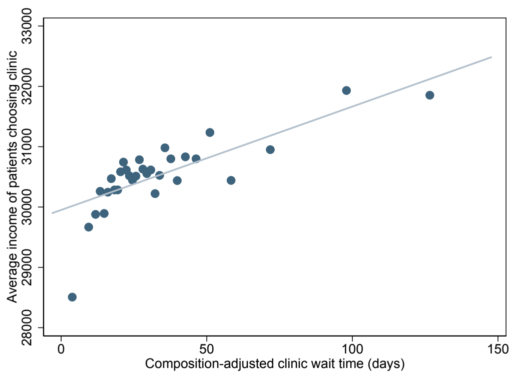
Figure A.6: Screening Effects of Wait Ties: Full Panel



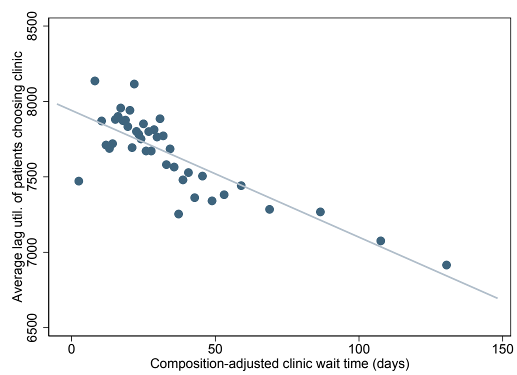
(a) $\mathbb{C}\left(w_{jt}, \overline{y}_{jt}\right)$



(b) $\mathbb{C}\left(w_{jt}, \overline{sick}_{jt}\right) < 0$



(c) $\mathbb{C}\left(\tilde{w}_{jt}, \overline{y}_{jt}\right) > 0$: residualized wait time



(d) $\mathbb{C}\left(\tilde{w}_{jt}, \overline{sick}_{jt}\right) < 0$: residualized wait time

Notes: Figure plots the covariance between the wait times at a clinic and the characteristics of patients seeking visits at that clinic, residualized of clinic and market-by-time fixed effects. Sub-figures (a) and (b) use the raw average wait time, while figures (c) and (d) first residualize the wait times for each visit on the patient characteristics for a given visit and take the average of the residualized wait time. The positive covariance between wait times and income indicates that at higher wait times, lower income veterans are less likely to choose a given clinic. The negative relationship between prior utilization and wait times indicates that at higher wait times, sicker (as proxied by lower VA costs) veterans are less likely to choose a given clinic. These patterns are consistent with the patterns documented using only the Choice Act variation in Section 4.3.

Table A.1: The Effect of the Choice Act Eligibility: Robustness

	All		TMs	
	Baseline	Include closest clinic x year effects	Baseline	Include closest clinic x year effects
	(1)	(2)	(3)	(4)
Panel A. Utilization				
Community visits (all)	0.235	0.149	0.177	0.108
	(0.033)	(0.036)	(0.067)	(0.072)
Community spending (VA -financed)	69.85	55.77	67.37	50.63
	(5.52)	(5.71)	(9.40)	(9.73)
Visits at VA clinics	-0.082	-0.097	-0.086	-0.070
	(0.020)	(0.022)	(0.031)	(0.033)
RVUs as VA clinics	-26.92	-41.29	-20.71	-31.43
	(8.50)	(9.05)	(14.42)	(15.27)
Spending at VA clinics	-42.03	-47.50	-32.99	-29.02
	(11.51)	(12.48)	(18.36)	(19.88)
Total visits (VA + community)	0.150	0.074	0.091	0.037
	(0.041)	(0.045)	(0.076)	(0.081)
Total VA-financed spending	27.82	8.27	34.38	21.62
	(13.35)	(14.37)	(21.59)	(23.18)
Panel B. Clinic characteristics				
Wait time	-2.25	-0.75	-2.65	-0.81
	(0.10)	(0.09)	(0.15)	(0.15)
Distance (miles)	-1.28	-0.84	-1.15	-0.77
	(0.06)	(0.05)	(0.08)	(0.08)

Notes: Table presents coefficient estimates from equation 5, for the whole sample (columns 1 and 2) and for the Traditional Medicare (TM) sample (columns 3 and 4) for whom the universe of community utilization is observed. Table presents robustness to including closest clinic by year fixed effects (columns 2 and 4). Community visits (all) indicate all visits at non-VA providers across VA and Medicare financing. Community spending (VA-financed) indicates community spending that is VA (not Medicare) financed. RVUs at VA clinics is a measure of utilization in which procedures are weighted identically to Medicare. VA spending is attributed to specific visits from accounting data by HERC. Total visits (VA + all community) captures all visits at VA and non-VA providers across VA and Medicare financing. Total VA financed spending include all VA spending across VA clinics and community care. Wait time and drive time indicate the average wait time and drive time veterans experience conditional on receiving any care, across VA and community options, where community wait times are calculated based on the time between authorization and visit, and VA wait times are calculated as described in the main text. Robust standard errors in parenthesis clustered at the veteran level.

A.2 Wait Time Eligibility

Unlike distance eligibility, which impacts all care for all time periods in the post period, wait time eligibility is determined based on endogenous market conditions, making it harder to analyze cleanly. Despite this, I use the variation from the wait time eligibility condition under Choice with the following specification:

$$y_{gst} = \beta WaitElig_{gst} + \theta_{gs} + \tau_t + \epsilon_{gst} \tag{14}$$

at the geography g (HRR), specialty s, and quarter t level. $WaitElig_{gst}$ is an indicator for whether a given geography, specialty, and time is wait time eligible, θ_{gs} capture specialty by geography fixed effects, and τ_t capture quarter fixed effects. This specification compares outcomes y_{gst} in time periods and markets in which veterans are wait-time eligible, to those that are not, relative to overall time trends and levels in the market. My two primary outcomes are interest are VA authorizations for community care, internal VA documentation that indicates that a patient is allowed to obtain community care, and VA utilization in a given specialty, market, and quarter. I focus on authorizations instead of claims because authorizations accurately measure specialty categorizations. Authorizations understate the extent of utilization relative to claims because authorizations cover a period of time in which multiple visits may occur. Community utilization in Table A.2 is therefore not comparable to Table 2 in magnitudes.

Table A.2 documents that community authorizations increase in wait time eligible quarters, but that this is not accompanied by a reduction in VA visits. This is consistent with the hypothesis that the VA is capacity constrained, as the ability to substitute to community care does not reduce overall utilization at VA clinics.

Table A.2: Wait Time Eligibility Results

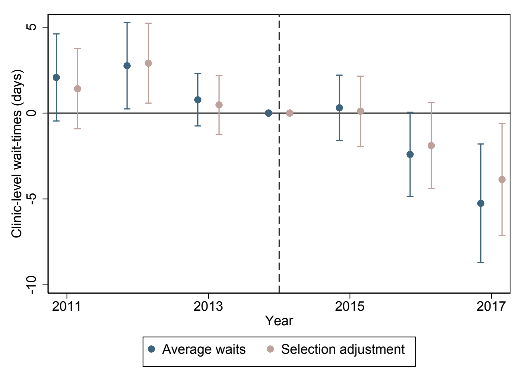
	Coefficient estimate
Community care authorizations / quarter	0.0010
	(0.0000)
VA visits / quarter	0.0004
	(0.0002)

Notes: Figure presents results from equation 14. Community care is measured in authorizations. Authorizations generally encompass multiple visits. VA care is measured in visits. Robust standard errors in parenthesis.

B Model Details

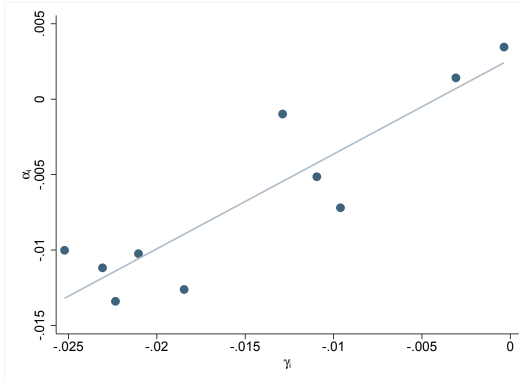
To generate an unselected distribution of waiting times, I zoom in to the smallest unit of analysis possible: the doctor by day level. For every day and at every physician where I do not observe an appointment made, I assume that the appointment date of the first subsequent appointment with that physician was available to any arriving patient at the initial index date. If a physician does not have any subsequent appointments for 90 days, I consider that physician unavailable. I then take the average of all "augmented" wait times across physicians and days within a clinic to obtain the unselected distribution of wait times. Figure B.1 re-creates Figure 5c with outcomes equal to both the raw mean and the selection-adjusted wait time and shows similar results.

Figure B.1: The Effect of Choice Act Exposure on Wait Times: Selection Adjustment



Notes: Figure plots coefficients from equation 6 using both raw averages and the selection-adjusted wait time.

Figure B.2: Correlation Between γ_i and α_i



Notes: Table presents binned scatterplot of the estimated relationship between $\gamma_i = \gamma(\mathbf{z}_i)$ (cost of waiting) and $\alpha_i = (\mathbf{z}_i)$ (price sensitivity).

Table B.1: Parameter Estimates: Heterogeneity

	Prefs for VA	Prefs for community	Distance	Wait times	Prices
	(1)	(2)	(3)	(4)	(5)
Age bin 2	0.144	0.523	-0.011	0.002	0.002
	(0.223)	(0.161)	(0.007)	(0.003)	(0.005)
Age bin 3	0.336	0.786	-0.009	0.003	-0.008
	(0.206)	(0.149)	(0.007)	(0.003)	(0.005)
Age bin 4	0.433	1.172	-0.014	0.003	-0.006
	(0.198)	(0.143)	(0.006)	(0.003)	(0.005)
Income bin 2	0.127	0.278	-0.010	0.001	0.002
	(0.145)	(0.089)	(0.005)	(0.003)	(0.003)
Income bin 3	0.026	0.489	-0.013	0.005	0.004
	(0.174)	(0.095)	(0.006)	(0.003)	(0.004)
Income bin 4	-0.065	0.407	-0.015	0.004	0.007
	(0.201)	(0.099)	(0.007)	(0.004)	(0.004)
Income bin 5	-0.339	0.351	-0.019	0.004	0.003
	(0.218)	(0.101)	(0.007)	(0.004)	(0.004)
Missing income	-0.209	0.421	-0.022	0.003	0.000
	(0.119)	(0.071)	(0.004)	(0.002)	(0.003)
Prior util. bin 2	0.367	-0.260	0.008	-0.000	-0.005
	(0.083)	(0.042)	(0.003)	(0.001)	(0.002)
Prior util. bin 3	0.430	-0.522	0.018	-0.000	-0.012
	(0.082)	(0.044)	(0.003)	(0.001)	(0.002)
Prior util. bin 4	0.499	-0.824	0.030	-0.002	-0.006
	(0.084)	(0.047)	(0.003)	(0.001)	(0.002)
No prior VA util.	-2.311	-0.028	-0.006	0.009	0.008
	(0.128)	(0.040)	(0.003)	(0.002)	(0.001)
New enrollee	-0.727	-0.216	0.006	0.008	0.012
	(0.172)	(0.079)	(0.005)	(0.003)	(0.003)
Priority 2	-0.271	-0.118	-0.000	0.002	0.001
	(0.100)	(0.051)	(0.003)	(0.001)	(0.002)
Priority 3	-0.143	-0.092	-0.007	0.001	-0.004
	(0.085)	(0.043)	(0.003)	(0.001)	(0.002)
Priority 4	-0.550	-0.157	0.002	-0.001	-0.004
	(0.128)	(0.066)	(0.004)	(0.002)	(0.003)
Priority 5	-0.402	-0.242	-0.006	0.003	-0.009
	(0.086)	(0.044)	(0.003)	(0.001)	(0.002)
Priority 6	-0.259	-0.117	-0.010	0.003	-0.009
	(0.148)	(0.069)	(0.005)	(0.002)	(0.002)

Notes: Table presents parameter estimates of heterogeneity parameters. Low age bins imply low ages. Low income bins imply low income. Low lagged utilization bins imply low utilization.