Methodological Appendices[1]

This document contains two appendices. Appendix A presents and calibrates the model that I use to estimate how adding dental, hearing, and vision coverage to Medicare would affect payments to MA plans and overall federal spending—and how those various effects would depend on how the new benefits are reflected in MA benchmarks and Part B premium calculations. Appendix B describes how I estimate how much MA plans are currently spending on dental, hearing, and vision overage.

Appendix A: Model of the Medicare Program

This appendix presents the model that I use to estimate the fiscal and related effects of adding dental, hearing, and vision coverage to Medicare—and how those effects would depend on how the new benefits are reflected in MA benchmarks and Part B premium calculations. This model is, in some respects, a simplified version of the model used by Curto et al. (2020). The core contribution of the model is that it allows me to capture how MA plans would change their bids under the various policy regimes, which, as will become clear below, has major implications for the policies' ultimate effects.

The appendix first presents my basic modeling framework. I then solve for the model's equilibrium and examine how that equilibrium would change under various policy regimes. Next, I calibrate the model by drawing on a rich empirical literature and use the calibrated model to produce the estimates in the main text. I then augment the model to account for changes in Medicare Part B premiums. I close by briefly discussing the implications of a few limitations of my model.

Model Setup

Medicare beneficiaries can enroll in either in traditional Medicare or one of a set $\mathcal{I}$ of identical MA plans. Following program rules, each MA plan submits a bid b^i that reflects the price it will accept to deliver the basic Medicare benefit package and receives a rebate $r^i = \delta(B - b^i)$ that must be passed along to plan enrollees in the form of supplemental benefits, where B is the payment benchmark and δ is the rebate percentage.[2] The plan incurs a per enrollee cost c_d to cover the basic Medicare benefit package, where $d \in \{0,1\}$ is an indicator for whether that benefit package includes dental, hearing, and vision coverage. Traditional Medicare incurs a per enrollee cost f_d to cover benefit package d.

Consumers select plans based on the MA plans' rebates, with each MA plan facing an identical demand function $D(r^i; r^{-i})$, where r^i denotes the rebate of plan i and r^{-i} denotes the rebates of the other plans in the market. I assume that total Medicare enrollment is fixed and normalized to one and let

$$D^{MA}\left(\left\{r^i\right\}_{i\in\mathcal{I}}\right) \equiv \sum_{i\in\mathcal{I}} D\left(r^i; r^{-i}\right) \quad \text{and} \quad D^{TM}\left(\left\{r^i\right\}_{i\in\mathcal{I}}\right) \equiv 1 - D^{MA}\left(\left\{r^i\right\}_{i\in\mathcal{I}}\right)$$

denote aggregate demand for MA plans and traditional Medicare, respectively.

[1] The rest of the analysis that these appendices are a part of appears at https://www.brookings.edu/essay/options-for-containing-the-cost-of-a-new-medicare-dental-hearing-and-vision-benefit/.

[2] This specification abstracts from the fact that the rebate percentage δ varies based on plan quality. It also abstracts from the (empirically rare) case of plans that submit bids that exceed the benchmark.

Importantly, this demand specification implicitly assumes that*, holding the rebate fixed*, demand for MA plans does not depend on whether the basic Medicare benefit includes dental, hearing, and vision coverage. This assumption is likely violated to some degree in practice. In particular, the reason that MA plans almost universally offer dental, hearing, and vision coverage is presumably that enrollees place a higher value on those benefits than they place on other potential uses of rebate dollars. Thus, reallocating rebate dollars from dental, hearing, and vision coverage to other types of supplemental benefits is likely to at least modestly reduce the value proposition that MA plans can offer enrollees.

In practice, however, this assumption is likely a reasonable approximation. A large portion of MA coverage for dental, hearing, and vision services has appeared only over the last few years, seemingly driven by plans' efforts to figure out how to allocate a rapid increase in average rebates (Friedman and Yeh 2021; MedPAC 2021b). That suggests that much of these benefits may be close to being the "marginal" supplemental benefit, in which case reallocating dollars to the next best supplemental benefits would have only a modest effect on the overall value that enrollees derive from a fixed pool of rebate dollars.

Equilibrium

I assume that the MA plans announce bids simultaneously and seek a symmetric equilibrium of the resulting game. I let $b_d^*(B)$ denote the equilibrium bids when policymakers set a benchmark B and benefit package d, and I let $r_d^*(B) \equiv \delta(B - b_d^*(B))$ denote the corresponding equilibrium rebate.

To characterize how different policy regimes would affect the equilibrium bids, observe that the profits earned by plan i when it submits a bid b^i are given by

$$\pi_d^i(b^i; r^{-i}, B) = D\big(\delta(B - b^i); r^{-i}\big)\big[b^i - c_d\big].$$

Importantly, it is easy to show that it is then always the case that

$$\pi_0^i\big(b^i; r^{-i}, B\big) = \pi_1^i\big(b^i + \Delta c; r^{-i}, B + \Delta c\big),$$

where $\Delta c \equiv c_1 - c_0$. That is, if the plan's cost of providing dental, hearing, and vision coverage is matched dollar-for-dollar by an increase in the benchmark, then the plan's profit function is essentially unchanged except that the bid required to achieve any specific level of profits increases by an amount Δc.

It follows immediately from this fact that the equilibrium bids satisfy

$$b_1^*(B + \Delta c) = b_0^*(B) + \Delta c. \tag{1}$$

That is, if policymakers add dental, hearing, and vision coverage to the basic Medicare benefit and the benchmark rises dollar-for-dollar with MA plans' cost of providing that coverage, then MA plans' equilibrium bids shift up by a commensurate amount.[3] A corollary of this result is that the equilibrium rebate and, thus, equilibrium demand for MA and traditional Medicare plans is unchanged by such a policy change. The result in equation (1) is the main tool I use to examine how the various policy changes under consideration here would affect MA plan bids, rebates, and overall program costs.

[3] Curto et al. (2015) similarly note that a fixed dollar change in the benchmark has the same effect on bids as an equivalent change in plan costs. This fact is one of the two essential ingredients underlying equation (1). The other is the assumption that demand for MA plans does not directly depend on whether the base benefit package includes dental, hearing, and vision coverage, holding the size of plan rebates fixed.

I note that a relationship like equation (1) would arise in a much more general class of models. It holds in a model in which MA plans are heterogeneous and face different demand functions or incur different costs (provided that the incremental cost of adding the new benefits is common across plans). It also holds in a model in which MA plans control more than just their bids, such how much effort they put into marketing or other aspects of plan design like network breadth or utilization management (provided that the incremental cost of adding the new benefits is independent of these other actions).

Equation (1) would also hold in some models where the addition of dental, hearing, and vision coverage has a direct effect on demand for MA plans (although equilibrium demand for MA and traditional Medicare would generally change in this case). In this case, the condition required for equation (1) to hold is that the inverse semi-elasticity of demand faced by each plan, $D(r^i; r^{-i}) \,/\, \dot{D}(r^i; r^{-i})$, be unaffected by the addition of the new benefit. This condition is potentially more reasonable than the assumption that demand is completely unaffected by addition of the new benefit. As discussed above, while adding dental, hearing, and vision coverage would likely reduce the overall value enrollees derive from a fixed rebate (which would tend to reduce the numerator of the inverse semi-elasticity), it would likely also reduce the value of the *marginal* rebate dollar (which would tend to reduce the denominator).

Estimating the Effects of Adding Dental, Hearing, and Vision Coverage

I now describe how this model can be used to estimate the effects of changing the base Medicare benefit package to include dental, hearing, and vision coverage. In what follows, I use B_d to refer to the benchmark that applies when the benefit package is d, and I define $\Delta B \equiv B_1 - B_0$.

Change in Bids and Rebates

I first characterize the change in the equilibrium bids and rebates from adding dental, hearing, and vision coverage. Using equation (1), it is straightforward to show that the change in the equilibrium bid satisfies

$$\Delta b^* \equiv b_1^*(B_1) - b_0^*(B_0) \approx \Delta c + (\Delta B - \Delta c)\frac{db_0^*}{dB}, \tag{2}$$

where I have suppressed the argument of the derivative $db_0^* \,/\, dB$ to streamline notation.

Estimating Δb^* thus requires only an estimate of how changes in the benchmark affect bids ($db_0^* \,/\, dB$), for which estimates exist in the literature, and values for ΔB and Δc. The corresponding change in the rebate is then easily obtained as $\Delta r^* \equiv r_1^*(B_1) - r_0^*(B_0) = \delta(\Delta B - \Delta b^*)$.

Change in Federal Benefit Outlays Per Medicare Beneficiary

Total federal benefit outlays per beneficiary for a benefit package d, which I denote G_d, is given by

$$G_d \equiv (b_d^* + r_d^*)D^{MA}(\{r_d^*\}) \; + f_d D^{TM}(\{r_d^*\}),$$

where here and below I suppress the arguments of b_d^* and r_d^* in order to streamline notation.

Thus, the change in federal benefit outlays from introducing the new benefit, $\Delta G \equiv G_1 - G_0$, is

$$\Delta G = \underbrace{(\Delta b^* + \Delta r^*)D^{MA}(\{r_0^*\}) + \Delta f D^{TM}(\{r_0^*\})}_{\text{static effect}} + \\ \underbrace{(\{\Delta b^* + \Delta r^* - \Delta f\} + \{b_0^* + r_0^* - f_0\})[D^{MA}(\{r_1^*\}) - D^{MA}(\{r_0^*\})]}_{\text{dynamic effect}}\,, \tag{3}$$

where I have made the definition $\Delta f \equiv f_1 - f_0$.

This change has two components. The first term, which I call the "static effect," reflects the direct change in payments under both traditional Medicare and MA, holding MA market share fixed. This term can be estimated given the estimates of Δb^* and Δr^* derived above, an estimate of the increase in traditional Medicare spending due to the benefit (Δf), and an estimate of MA market share at baseline ($D^{MA}(\{r_0^*\})$). The second term, which I call the "dynamic effect," reflects the change in payments due to any change in MA market share. This term arises because per beneficiary spending in MA and traditional Medicare may differ. Estimating this term additionally requires an estimate of the difference in payments between MA and traditional Medicare at baseline ($b_0^* + r_0^* - f_0$) and an estimate of the total change in MA enrollment due to addition of the new benefits ($D^{MA}(\{r_1^*\}) - D^{MA}(\{r_0^*\})$).

Calibrating the Model

I now use the relationships derived above to produce quantitative estimates of how adding these new benefits to Medicare would change MA bids and rebates, as well as federal benefit spending, under two scenarios for how the new benefits are reflected in MA benchmarks. In the first scenario, spending on the new benefits is fully included in the calculation of the MA benchmarks, so $\Delta B = 1.11\Delta f$, where the factor 1.11 reflects the MedPAC (2021a) estimate that MA benchmarks are 111% of per enrollee spending in traditional Medicare in 2021 (after accounting for coding intensity differences). In the second scenario, spending on the new benefits is excluded from the calculation of the MA benchmarks, so $\Delta B = 0$.

Change in Equilibrium Bids and Rebates

I first estimate changes in bids and rebates. It is convenient to express the results as a fraction of the cost of the new benefits under traditional Medicare, Δf, so I work with a normalized version of equation (2):

$$\frac{\Delta b^*}{\Delta f} \approx \frac{\Delta c}{\Delta f} + \frac{db_0^*}{dB}\left(\frac{\Delta B}{\Delta f} - \frac{\Delta c}{\Delta f}\right). \tag{4}$$

I now describe the parameters I use for calibration. To set $\Delta c \,/\, \Delta f$, I assume that MA plans will have the same utilization advantage over traditional Medicare with respect to the new services as for other outpatient services. Based on the Curto et al. (2019) estimate of that difference, I set $\Delta c/\Delta f = 0.886$. I set the rebate rate $\delta = 0.65$, the average rebate rate reported by MedPAC (2021b) for 2021.

I set db_0^*/dB by adopting the estimate from CBO (2018) that a one dollar increase in the benchmark increases plan bids by \$0.50. I do so because this parameter estimate is relatively important to the results, and one goal of this analysis is to help policymakers and the broader public understand how different policy choices will affect Congress' ability to meet fiscal targets that apply to reconciliation legislation. Since CBO will be the arbiter of whether those targets are met, aligning with CBO furthers that goal.

Nevertheless, I note that recent empirical literature, which is summarized in Table A1, suggests that benchmark changes may have somewhat larger effects on bids.[4] Three of the studies in Table A1 estimate this parameter using within-county variation in MA benchmarks over time (Song, Landrum, and Chernew 2012; 2013; Pelech and Song 2018). Two of the three estimate that a one dollar increase in the benchmark

[4] Table A1 only includes estimates that focus on the period after the establishment of the modern MA bidding structure in 2006. Cabral, Geruso, and Mahoney (2018) present similar estimates that pertain to an earlier MA payment regime. Translated into the current policy environment, their estimates also suggest that a one dollar increase in the benchmark would increase bids by around \$0.50.

Table A1: Empirical Estimates of the Effect of Benchmark Changes on Bids

Study	Estimate of db_0^*/dB	Time Period
Song, Landrum, and Chernew (2012)	0.49	2006-2010
Song, Landrum, and Chernew (2013)	0.53	2006-2010
Pelech and Song (2018)	Pre-ACA: 0.60 Post-ACA: 0.56	Pre-ACA: 2006-2012 Post-ACA: 2013-2015
Duggan, Starc, and Vabson (2016)	0.91	2007-2010

Table A2: Change in MA Bids, Rebates, and Payments Under Two Benchmark Policies

Percentage of the per enrollee cost of the new benefits in traditional Medicare

Treatment of New Benefits in Benchmark	Bid	Rebate	Total payment
Included	100	7	107
Excluded	44	-29	16

increases plan bids by more than \$0.50. Duggan, Starc, and Vabson (2016) exploit a discontinuity in benchmarks at a population threshold used to determine a county's urban or rural status. They estimate that a one dollar increase in the benchmark increases bids by \$0.91. This estimate has a particularly strong claim to internal validity but its external validity in larger urban areas that fall far from the threshold is less clear. Precisely how to weight these studies is uncertain, but the fact that all but one of the estimates exceeds \$0.50 suggests that the best estimate may exceed \$0.50. If the Duggan, Starc, and Vabson study merits even modest weight, then the best estimate of db_0^*/dB may exceed \$0.60.

Table A2 reports the resulting estimated changes in bids and rebates under the two potential policy regimes for setting the MA benchmarks. These results are discussed in detail in the main text.

Change in Federal Benefit Outlays Per Medicare Beneficiary

I now estimate effects on overall federal benefit outlays per Medicare beneficiary. It is once again convenient to express the results as a fraction of the cost of providing the new benefits under traditional Medicare, Δf, so I work with a suitably normalized version of equation (3):

$$\frac{\Delta G}{\Delta f} = \left[\left(\frac{\Delta b^*}{\Delta f} + \frac{\Delta r^*}{\Delta f}\right) D^{MA}(\{r_0^*\}) + D^{TM}(\{r_0^*\}) \right] + \left(\left\{\frac{\Delta b^*}{\Delta f} + \frac{\Delta r^*}{\Delta f} - 1\right\}\left\{\frac{\Delta f}{f_0}\right\} + \left\{\frac{b_0^* + r_0^*}{f_0} - 1\right\} \right) \left[\frac{D^{MA}(\{r_1^*\}) - D^{MA}(\{r_0^*\})}{\Delta f \;/\; f_0}\right] \tag{5}$$

The first term in equation (5), which corresponds to the "static effect" defined in equation (3), contains only one parameter that has not yet been specified: baseline MA enrollment, $D^{MA}(\{r_0^*\})$. I take $D^{MA}(\{r_0^*\}) = 0.55$, CBO's July 2021 baseline projection of average private plan market share among Medicare beneficiaries with both Part A and Part B coverage during the 2022-2031 period (CBO 2021).[5]

[5] As noted in the main text, Medicare private health plan enrollment consists almost exclusively of MA plans.

Table A3: Elasticity or Semi-Elasticity of MA Market Share with Respect to the Benchmark

Study	Elasticity	Semi-Elasticity	Time Period
Baicker, Chernew, and Robbins (2013)	4.3	0.3	1999-2009
Baicker and Robbins (2015)	1.2	0.2	1999-2011
Curto, Einav, Levin, and Bhattacharya (2020)	5.3	0.6	2006-2011
Duggan, Starc, and Vabson (2016)	7.7	1.4	2007-2010

Note: With the exception of Duggan, Starc, and Vabson (2016), these studies do not report elasticities or semi-elasticities. The table therefore derives suitable estimates from information reported in each study. The details of those calculations differ across studies depending on what the study reports. Details are available upon request. Duggan, Starc, and Vabson (2016) report a slightly lower elasticity estimate of 7.2, but it is unclear how that estimate was derived, and this table reports an estimate derived using methods that are consistent with the methods used to derive elasticities for the other studies.

The second term in equation (5) corresponds to the "dynamic effect" defined in equation (3). Naturally, a major determinant of the size of this effect is the change in MA market share ($D^{MA}(\{r_1^*\}) - D^{MA}(\{r_0^*\})$). To estimate this quantity, I note first that this change can be approximated as follows:

$$\begin{aligned} D^{MA}(\{r_1^*(B_1)\}) - D^{MA}(\{r_0^*(B_0)\}) &= D^{MA}(\{r_0^*(B_1 - \Delta c)\}) - D^{MA}(\{r_0^*(B_0)\}) \\ &\approx \left[\frac{dD^{MA}\big(r_0^*(B)\big)}{dB}\right]_{B=B_0} \cdot [\Delta B - \Delta c]. \end{aligned} \tag{6}$$

Equation (6) shows that the desired change can be estimated given an estimate of how changes in the benchmark affect aggregate enrollment in MA plans, which can be obtained from the literature.

In applying those estimates in this setting, it is useful to transform equation (6) so that the effect of changes in the benchmark on MA market share appears in either elasticity form

$$D^{MA}(\{r_1^*\}) - D^{MA}(\{r_0^*\}) = \left[\left.\frac{dD^{MA}\big(r_0^*(B)\big)}{dB}\right|_{B=B_0} \cdot \frac{B_0}{D^{MA}(\{r_0^*\})}\right]\left[\frac{\Delta B}{\Delta f} - \frac{\Delta c}{\Delta f}\right]\frac{\Delta f}{f_0}\frac{f_0}{B_0}\, D^{MA}(\{r_0^*\}); \tag{7}$$

or, alternatively, semi-elasticity form

$$D^{MA}(\{r_1^*\}) - D^{MA}(\{r_0^*\}) = \left[\left.\frac{dD^{MA}\big(r_0^*(B)\big)}{dB}\right|_{B=B_0} \cdot B_0\right]\left[\frac{\Delta B}{\Delta f} - \frac{\Delta c}{\Delta f}\right]\frac{\Delta f}{f_0}\frac{f_0}{B_0}. \tag{8}$$

Table A3 presents estimates of the relevant elasticity or semi-elasticity derived from four studies that examine the relationship between MA benchmarks and MA market share.[6] I limit my attention to studies that present evidence for years after the introduction of the modern MA bidding system in 2006. Two studies use within-county variation in MA benchmarks over time to estimate an elasticity (Baicker, Chernew, and Robbins 2013; Baicker and Robbins 2015). Duggan, Starc, and Vabson (2016) use the

[6] These estimates capture the *total* effect of a change in the benchmark on MA market share, including effects that arise through channels other than a change in the rebate, like changes in marketing effort, that are not captured in the formal model that I consider here (e.g., Duggan, Starc, and Vabson 2016). That is desirable and should make the estimates more robust to any omissions of the particular modeling framework considered here. Moreover, as noted above, the model could be augmented to explicitly incorporate these other channels.

Table A4: Change in Per Enrollee Federal Benefit Spending Under Two Benchmark Policies

Percentage of the per enrollee cost of the new benefits in traditional Medicare

Treatment of New Benefits in Benchmark	Static Effect	Dynamic Effect		Total	
		Elasticity	Semi-Elasticity	Elasticity	Semi-Elasticity
Panel A. Smaller benefit, $\Delta f / f_0 = 0.03$					
Included	104	2	1	106	104
Excluded	54	-3	-1	51	53
Memo: % Difference				-52	-49
Panel B. Benefit similar to 2019 House bill when fully phased in, $\Delta f / f_0 = 0.06$					
Included	104	2	1	106	104
Excluded	54	2	1	56	54
Memo: % Difference				-48	-48
Panel C. Larger benefit, $\Delta f / f_0 = 0.09$					
Included	104	2	1	106	104
Excluded	54	7	2	61	55
Memo: % Difference				-43	-47

regression discontinuity approach described above, while Curto, Einav, Levin, and Bhattacharya (2020) estimate a full demand system for MA plans and then simulate the effects of benchmark changes.

It is clear from Table A3 that the elasticity and semi-elasticity estimates vary widely across studies. For the time being, I adopt the average value of these parameters across the four studies, but, as I discuss below, it will turn out that this parameter has limited implications for the fiscal cost estimates.

Calibrating equations (6), (7), and (8) also requires specifying a few other quantities. First, based on estimates from MedPAC (2021a), I set $(b_0^* + r_0^*)/f_0$, the baseline ratio of per enrollee MA payments to traditional Medicare payments, equal to 1.04. Similarly, I set $f_0 \ / \ B_0$, the ratio of traditional Medicare spending to the benchmark under the status quo, equal to 1/1.11. In both cases, I use the MedPAC estimates that fully adjust for coding intensity differences between MA and traditional Medicare.

I note that equations (5) through (8) demonstrate that the effect on per enrollee federal benefit spending does not scale exactly proportionally with the cost of the new benefits in traditional Medicare, Δf, unlike the effects on bids and rebates. This is essentially because the size of the new benefits determines how the overall payment differential between traditional Medicare and MA changes in response to the new benefit, which is in turn a key determinant of the dynamic effect in equation (5). Thus, it is necessary to specify the size of the benefit under consideration. I do so in the normalized form $\Delta f \ / \ f_0$ and consider three values for this ratio: 0.03, 0.06, and 0.09. As noted in the main text, I focus on the estimates with $\Delta f / f_0 = 0.06$, which is similar to the size of the benefit passed by the House in 2019.

Table A4 presents the resulting estimates. A notable finding is that the estimates of the "dynamic effect" from equation (5) are generally quite small. This primarily reflects the fact that, under all scenarios for the size of the new benefits and the treatment of those benefits in the benchmarks, the differential in payments between MA and traditional Medicare is of modest size. It follows that even relatively large swings in MA enrollment then have only relatively modest fiscal implications.

This fact has a pair of subsidiary implications. First, it implies that uncertainty about how benchmark changes affect MA enrollment because of the wide range of estimates in Table A3 is relatively unimportant for estimating the fiscal consequences of these policy changes. Similarly, uncertainty about whether those parameter estimates are best applied in elasticity or semi-elasticity form are also unimportant. Second, because the static effect does scale exactly proportionally with the size of the new benefit, the *proportional* reduction in fiscal cost achieved by excluding the new benefits from the benchmarks varies relatively little over a fairly broad range of potential sizes for the new benefits.

Incorporating Changes in Medicare Premiums

The estimates presented in Table A4 reflect effects on the federal government's benefit outlays and do not incorporate any effects those changes may have on Part B premium receipts.

Consistent with the main text, I consider two scenarios for how the new benefits would affect Part B premiums. The first set of scenarios mirrors the legislation passed by the House in 2019, under which costs "attributable to" the new benefits would have been excluded from Part B premium calculations.[7] In the second set of scenarios, spending on the new benefits would be incorporated into Part B premium calculations in the same manner as spending on existing Part B benefits.

Regarding the first scenario, I note that there is some ambiguity about what costs would be considered to be "attributable to" the new benefits and, thus, excluded from premium calculations. For this analysis, I assume that this term would be interpreted to encompass only the "accounting" cost of the new benefit: the amounts that traditional Medicare and MA *directly* spend on the newly covered services. That accounting cost will generally differ from the actual change in federal benefit spending because, as the results reported above demonstrate, the change in payments to MA plans will generally not align with the actual costs MA plans incur to deliver the new benefit. Excluding the actual change in federal benefit spending is theoretically possible, but it would require the federal government to estimate how MA bids and enrollment would have evolved in a counterfactual world without the new benefits. This would be administratively challenging and would represent a departure from current procedures for setting the Part B premium, so I assume that the provision would not be applied that way in reality.

To make progress in estimating these amounts, I let ΔA denote the per enrollee accounting cost of the new benefit, which it is straightforward to see can be written as follows:

$$\Delta A = D^{MA}(\{r_1^*\})\Delta c + D^{TM}(\{r_1^*\})\Delta f.$$

Letting E be an indicator for whether these accounting costs are included in premium calculations, the change in per enrollee premium receipts, which I denote ΔP, can then be written as

$$\Delta P = s(1-E)\Delta A + sw(\Delta G - \Delta A),$$

where s is the Part B premium share and w is the share of non-accounting costs that would be allocated to Part B. The net federal cost of the new benefits is then given by $\Delta N = \Delta G - \Delta P$. After normalizing by

[7] Sections 601(g), 602(d), and 603(h) in H.R.3, 116th Congress (2019).

the cost of the new benefits in traditional Medicare, Δf, all of these amounts can be calculated using the amounts already estimated in preceding sections and an estimate of the new parameters s and w.

To set s, the Part B premium share, I begin with projections of the share of Part B benefit spending that is offset by premium collections (including both standard and income-related premiums) in CBO's July 2021 baseline (CBO 2021). This share averages 27.6% over the 2022-2031 period. A portion of those premiums will ultimately be paid by the federal government via the Medicaid program. Using data from the 2020 Medicare Trustees Report and Medicaid Financial Management Reports, I estimate that the federal government paid 10% of Part B premiums in fiscal year 2019. I therefore set $s = 0.9 \times 0.276 = 0.248$. To set w, I assume that the proportion of the change in non-accounting costs that was allocated to Part B would equal the Part B share of total Part A and B spending at baseline. In CBO's July 2021 baseline, this share averages 56.4% over the 2022-2031 period, so I take $w = 0.564$.

Table A5 reports the resulting estimates. To streamline the presentation, I only report results for simulations where the empirical estimates of the effect of benchmark changes on MA enrollment are applied in elasticity form. However, as was the case in Table A4, the estimates computed from applying these estimates in semi-elasticity form are similar. Once again, the estimates for $\Delta f / f_0 = 0.06$ are the ones I focus on in the main text, but the estimates for other benefit sizes are similar.

Table A5: Change in Different Measures of Per Enrollee Medicare Spending and Premiums

Treatment of New Benefits for Purposes of the…		**Change (% of per enrollee cost of new benefits in traditional Medicare)**			**Memo: % Difference in net spending vs. first row**
…MA benchmarks	…Part B premium	Benefit Outlays	Premium Receipts	Net Federal Outlays	
Panel A. Smaller benefit, $\Delta f / f_0 = 0.03$					
Included	Excluded	106	2	104	0
Excluded	Excluded	51	-6	57	-46
Included	Included	106	25	81	-22
Excluded	Included	51	17	33	-68
Panel B. Benefit similar to 2019 House bill when fully phased in, $\Delta f / f_0 = 0.06$					
Included	Excluded	106	2	104	0
Excluded	Excluded	56	-6	61	-41
Included	Included	106	25	81	-22
Excluded	Included	56	18	38	-64
Panel C. Larger benefit, $\Delta f / f_0 = 0.09$					
Included	Excluded	106	2	104	0
Excluded	Excluded	61	-5	66	-37
Included	Included	106	25	81	-22
Excluded	Included	61	19	42	-60

Model Limitations

In closing, I discuss two limitations of my analysis. First, my model abstracts from health status differences between MA and traditional Medicare enrollees, as well as the operation of the MA risk adjustment system. Second, my model assumes that costs in traditional Medicare are independent of MA market share. This is contrary to some research suggesting that increases in MA market share reduce costs in traditional Medicare, possibly because utilization management strategies used by MA plans cause practice style changes that then generate "spillover" reductions in utilization among traditional Medicare enrollees (e.g., Baicker, Chernew, and Robbins 2013; Baicker and Robbins 2015).

In what follows, I conclude that more fully accounting for risk selection could moderately increase my estimate of the fiscal savings from excluding the new benefits from MA benchmarks, while allowing for spillovers from MA to traditional Medicare could reduce the estimated savings, although there is considerable uncertainty about the size of any spillovers. Additionally, I note that CBO does not appear to have included large effects along these lines in prior estimates of proposals affecting MA. This suggests that, whatever may happen in reality, my baseline estimates may align reasonably well with CBO's.

Risk Selection

I first consider the consequences of fully incorporating risk selection into my analysis. To start, I note that even though risk selection is not explicitly included in my model, some selection effects are implicitly captured at the calibration stage. In particular, the behavioral elasticities I use to calibrate the model—including the effect of benchmark changes on plan bids and the effect of benchmark changes on MA enrollment—are estimated using methodologies that should capture any effects that are mediated through selection.[8] Additionally, the MedPAC (2021a) estimates I use to calibrate the ratio of MA benchmarks and payments to traditional Medicare costs implicitly adjust for health status differences to the extent that those differences are offset by the MA risk adjustment system.

Nevertheless, there are two ways in which my estimates might change if risk selection were incorporated into the analysis in a more explicit way. First, because payments to MA plans are risk-adjusted, the impact of changes in MA payments depends on the "risk weighted" market share of MA plans (e.g., Curto et al. 2020). By contrast, because my model does not explicitly incorporate selection, my calculations are based on nominal MA market share. Kronick and Chua (2021) estimate that the average MA risk scores used for payment purposes were around 6 percent higher than the average risk score of a traditional Medicare enrollee in 2017. If applied to my baseline estimate of MA market share of 55%, this estimate implies that the risk-weighted MA market share would be only slightly higher at 56% (=0.55*1.06/[0.45 + 0.55*1.06]). Accounting for this difference would have only a very slight effect on my results.

Second—and potentially more important—the MedPAC comparisons of MA benchmarks and payments to traditional Medicare costs that I use for calibration purposes effectively assume that the MA risk adjustment system fully offsets health status differences between MA and traditional Medicare (after incorporating MedPAC's preferred estimate of coding intensity differences). However, there is some evidence that MA plans have selection advantages over traditional Medicare that are not offset by the MA risk adjustment system, even with an appropriate coding intensity adjustment. For example, the

[8] The results of Cabral, Geruso, and Mahoney (2018) also suggest that selection considerations are not particularly important to understanding how marginal changes in MA payment policy affect plan bids.

estimates of Curto et al. (2019) imply that health status differences that are not offset by the MA risk adjustment system reduce MA plans' claims spending by 17% relative to traditional Medicare.

While there have been changes to MA risk adjustment that might have reduced these differences since the period examined by Curto et al. (2019), it is worth considering how accounting for differences along these lines might affect my results. There are two main channels to consider:

- *Size of benchmark changes:* One way accounting for differences like these could affect my results is by changing my estimate of how much MA benchmarks would rise if the new benefits were included in MA benchmarks. In particular, I assume that MA benchmarks would rise by 111% of the cost of providing the new benefits in traditional Medicare, based on MedPAC's estimate that MA benchmarks are 111% of risk-adjusted per enrollee traditional Medicare spending in 2021 (after applying MedPAC's best estimate of coding intensity differences).

  But if the Curto et al. estimates is correct—and MA plans' selection advantage applied equally to the new Medicare benefits—then MA benchmarks might rise by more like 134% (=1.11/[1-0.17]) of the cost of the new benefits. A larger benchmark increase would increase the fiscal cost of the policy if the new benefits were included in MA benchmarks and, thus, increase the savings from excluding the new benefits from MA benchmarks.

  As a crude way of gauging the importance of this effect, I ran simulations in which benchmarks increased by 134% of the cost of the new benefits in traditional Medicare, rather than 111%. The main results were qualitatively similar. Notably, the reduction in federal costs from excluding the new benefits from MA benchmarks was 47%, compared to 41% in my baseline simulations. Moreover, any selection advantage MA plans currently hold may not fully translate to the new benefits (Wix and Fontana 2020), which could attenuate this effect considerably.

- *Baseline payment differences between traditional Medicare and MA:* As discussed in prior sections, part of the fiscal effect of these policies is mediated through changes in MA market share, what I call the "dynamic" effect in equation (3). Those dynamic effects depend on the baseline payment differential between traditional Medicare and MA. The MedPAC estimates I use for calibration suggest that MA plans are paid 104% of what traditional Medicare would spend on the same beneficiaries. But if risk adjustment were imperfect, this difference could be larger.

  If that were the case, then policy changes that increase MA enrollment would tend to have a larger fiscal cost than I estimate here, while policy changes that reduce MA enrollment would tend to have a smaller cost. In general, this would suggest that the savings from excluding the new benefits from MA benchmarks would be larger than I estimate.

  It is not clear, however, how large the impact would be. Importantly, while Curto et al. provide an estimate of how much the MA risk adjustment system overestimates costs for the *average* MA enrollee, what matters here is how much it overpredicts costs for enrollees *on the margin* between traditional Medicare and MA. By construction, the MA risk adjustment model accurately predicts costs on average for traditional Medicare enrollees, so it is generally reasonable to expect that any overprediction for marginal MA enrollees (who fall in between the average MA enrollee and the average traditional Medicare enrollee with respect to their propensity to select MA) will be smaller than the overprediction for the average MA enrollee.

As a crude way of gauging the importance of this effect, I ran simulations in which the baseline payment differential between MA and traditional Medicare enrollees was 110% rather than the baseline estimate of 104%. As expected, I estimate larger savings from excluding the new benefits from the MA benchmarks: 52% in these simulations versus 41% in my baseline simulations. I note that, under these assumptions, my results also become much more sensitive to assumptions about how much MA enrollment changes in response to changes in the benchmark.

As a final note, CBO has previously stated that "enrolling a beneficiary in Medicare Advantage costs the Medicare program slightly more than enrolling the same beneficiary in Medicare FFS" in the context of discussing the fiscal consequences of MA enrollment changes (CBO 2018). The descriptor "slightly more" suggests that CBO's estimate of the baseline payment differential between MA and traditional Medicare is broadly similar to the MedPAC estimates I use here (at least for the marginal enrollee). It follows that my baseline estimates may be reasonably similar to CBO's in this respect at least.

MA-to-Traditional-Medicare Spillovers

I now consider the potential effects of incorporating spillovers. If spillovers are important, then policy changes that increase (reduce) MA enrollment would tend to have a smaller (larger) fiscal cost than I estimate here. Correspondingly, incorporating spillovers would suggest that the fiscal savings from excluding the new benefits from MA benchmarks might be smaller than I estimate here.

The key question, therefore, is how large these spillover effects may be, particularly in an environment where traditional Medicare increasingly uses alternative payment models that may generate spillover effects similar to those generated by MA (e.g., MedPAC 2021b). Recent studies using cross-sectional variation in MA market share find that increases in MA market share have at most modest effects on spending in traditional Medicare (Johnson et al. 2016; Stensland 2019).[9] For example, estimates presented by Stensland (2019) imply that a 10 percentage point increase in MA market share reduces per enrollee traditional Medicare spending by around 0.5 percent. Similarly, Henke et al. (2018) use within-county variation in MA market share over time and find that, if anything, higher MA market share slightly *increases* traditional Medicare spending in years after enactment of the Affordable Care Act (ACA).

However, a potential concern with studies that use cross-sectional and longitudinal variation is that areas with higher MA market share may differ in other ways that also affect traditional Medicare spending, which may result in biased estimates. Feyman, Pizer, and Frakt (2021) seek to address this limitation with an instrumental variables strategy that exploits certain variation in MA benchmarks produced by the post-ACA benchmark formula. They estimate very large spillovers, with a 10 percentage point increase in MA market share producing a 7 percent reduction in traditional Medicare spending. However, the authors' first-stage estimates have the surprising feature that higher benchmarks actually *reduce* MA market share. This hard-to-rationalize result suggests that the authors' instrument does not satisfy the exclusion restriction required to obtain valid estimates, which counsels caution in applying their results.[10]

[9] Johnson et al. (2016) estimate a county-level panel regression that includes time controls but not county fixed effects. Hence, their estimates of the effect of MA market share are identified using cross-sectional variation.

[10] The authors argue that it is plausible that some of the benchmark variation isolated by their instrument would be expected to have a negative effect on MA market share, although their explanation is hard to reconcile with their stated goal of isolating benchmark variation created by discontinuities in the ACA benchmark formula. Regardless, if different dimensions of benchmark variation do indeed have different-signed effects on MA market

There are also additional biases that, in principle, affect the cross-sectional, longitudinal, and instrumental variable studies alike. In particular, increases in MA market share could siphon the healthiest traditional Medicare enrollees out of the program, which could cause an increase in average costs in traditional Medicare that would mask reductions in utilization due to spillovers. On the other hand, Stensland (2019) notes that higher MA market share could cause more intensive diagnosis coding in traditional Medicare, making traditional Medicare enrollees look sicker. In studies that control for the risk scores of traditional Medicare enrollees, this could cause increases in MA market share to be associated with declines in traditional Medicare spending even if changes in MA market share do not affect utilization in traditional Medicare. Additionally, the studies catalogued above largely use data that extends only through the first several years following implementation of the Affordable Care Act, so they may not fully reflect an environment with widespread use of alternative payment models in traditional Medicare.

In light of the limitations of the existing literature, the importance of spillovers is uncertain. Weighing the available evidence, a reasonable best guess is that MA has modest spillover effects similar to those observed in the cross-sectional studies, in which case incorporating spillover effects would cause modest reductions in my estimates of the savings from excluding the new benefits from MA benchmarks. But there is considerable uncertainty around this conclusion and further research would be useful.

Additionally, whatever may be the case in reality, I note that CBO does not appear to have incorporated spillover effects in recent cost estimates. In particular, in discussing the potential fiscal consequences of changes in MA enrollment due to change in MA payment policy, CBO (2018) makes no mention of the possibility of spillovers, strongly suggesting that those effects are not included in CBO's estimates. This suggests, once again, that my baseline estimates may be similar to CBO's in this respect at least.

share, then their instrument would not satisfy the monotonicity condition that is typically needed for instrumental variable methods to recover an interpretable local average treatment effect (Imbens and Angrist 1994).

Appendix B: Current MA Plan Spending on Dental, Hearing, and Vision Coverage

This appendix describes how I estimate what MA plans are currently spending on dental, hearing, and vision coverage. As described in the main text, that estimate allows me to estimate the net change in spending on those forms of coverage under the policies considered here, as well as how spending on other types of supplemental benefits would change in various policy scenarios.

I consider two recent studies that provide evidence on MA plan spending on these services. Willink et al. (2020) use the 2016 Medicare Current Beneficiary Survey (MCBS) to estimate average total and out-of-pocket spending on dental, hearing, and vision services by Medicare beneficiaries.[11] Their estimates imply that MA enrollees with dental coverage incurred $177 in dental costs covered by a third-party payer in 2016. The corresponding estimate for MA enrollees with vision coverage is $64, and the estimate for hearing coverage is $19.[12] These estimates are displayed in Column 1 of Table A6.

Table A6: Willink et al. Estimates of Spending for MA Enrollees with Dental, Hearing, or Vision Coverage

	(1)	(2)	(3)
	Average Annual Per Enrollee Payments for Relevant Services		
	All Third-Party Payments	Implied MA Plan Payments	
Type of Coverage		$	Share of traditional Medicare spending
Dental	$177	$117	1.21%
Vision	$64	$60	0.62%
Hearing	$19	$19	0.20%
Total	$260	$196	2.03%

A portion of these costs are likely borne by dental or vision plans that enrollees hold separately from their MA plans. As a crude way of accounting for this possibility, I assume that the share of MA enrollees with separate coverage for each of these services is the same as the share of traditional Medicare enrollees with coverage for these services.[13] I then estimate MA plan spending by reducing the estimates in Column 1 in proportion to the share of total coverage among MA enrollees accounted for by separate coverage. The resulting estimates of MA plan liability are in Column 2 of Table A6. As an example, Willink et al. report

[11] To be precise, Willlink et al. report the probability of having any relevant visits, as well as average spending conditional on having a visit. I recover unconditional spending by multiplying these estimates.

[12] Oddly, Willink et al. find that even beneficiaries who did not report having dental, hearing, and vision coverage incur some expenses that are covered by insurance. This could, in part, reflect services covered by Medicare even under current law. More likely, however, it reflects mismeasurement of coverage status. In addition to the usual misreporting errors by enrollees, Freed et al. (2021) note that the 2016 MCBS suffered from data collection and processing problems that led it to understate dental coverage. If underreporting of coverage is the only problem, it may not meaningfully affect the particular Willink et al. estimates that I rely upon here. If overreporting of coverage is also a problem, then these estimates could understate actual plan liability for these services.

[13] MA enrollees might be less likely to hold separate dental or vision coverage precisely because they receive coverage through MA. If so, I will underestimate the costs that MA plans bear for these forms of coverage.

that 21% of traditional Medicare enrollees had dental coverage in 2016, compared to 62% of MA enrollees, so I reduce the estimate in Column 1 by 34% (= 0.21/0.62) to obtain the estimate in Column 2.

The second study I consider is Wix and Fontana (2020), who use a proprietary database of MA claims to analyze spending on dental services in 2018 by people enrolled in MA plans that include dental coverage. They estimate spending on dental services of $32 per enrollee per year.[14] The authors' estimates combine plan liability and out-of-pocket liability, but only the former is of interest for the present purposes. To account for this fact, I somewhat arbitrarily reduce the authors' estimate by 20% to $26. MA plans typically charge lower cost-sharing for preventive dental services, but higher cost-sharing for many other dental services (Freed, Ochieng, et al. 2021), so this may be a reasonable approximation.

The Willink et al. (2020) and Wix and Fontana (2020) estimates paint very different pictures of how much MA plans are currently spending on dental services. And it is not obvious which of these estimates should be preferred. The MCBS data used by the Willink et al. have the advantage of being nationally representative, but survey data are vulnerable to misreporting. The proprietary claims database used by Wix and Fontana, on the other hand, is likely less vulnerable to data errors, but is presumably not representative of MA plans nationwide. Given that, I proceed by combining the two estimates.

Specifically, I first express the various estimates as percentages of per enrollee traditional Medicare spending in the relevant year.[15] The normalized versions of the Willink et al. estimates are in Column 3 of Table A6, while the Wix and Fontana dental estimate is 0.25% of per enrollee traditional Medicare spending in 2018. I then take the simple average of the two dental estimates and add the Willink et al. vision and hearing estimates (since they are the only estimates available for these benefit categories). This yields an estimate that an MA plan that elects to provide all three forms of coverage incurs costs equivalent to 1.55% of per enrollee traditional Medicare spending to do so.

These forms of coverage have become steadily more common in MA and are approaching universality in 2021 (Freed, Biniek, et al. 2021; Friedman and Yeh 2021; MedPAC 2021b). Thus, I adopt the full 1.55% estimate as my estimate of baseline MA plan spending on coverage for these services. The analysis in the main text focuses on a policy scenario in which spending on the new benefits under traditional Medicare is 6% of baseline per enrollee spending. In that scenario, MA plans' baseline spending on dental, hearing, and vision coverage is equivalent to 26% of the cost of the new benefits in traditional Medicare.

I note that the fact that MA plans have become more likely to cover dental, hearing, and vision coverage over time could cause this to be an overestimate if people who historically opted for MA plans with this coverage had particularly high demand for these services. On the other hand, the increase in the prevalence of this coverage has seemingly been accompanied by an increase in the generosity of the coverage plans offer (Friedman and Yeh 2021), which could make this an underestimate. Additionally, to the extent that the generosity of MA dental, hearing, and vision coverage would continue to become more generous in future years under current law, it could be a particular underestimate for future years.

[14] The authors do not report an overall sample average. However, their estimates for specific risk score groups together with information on the size of each risk score group can be used to calculate an overall average.

[15] In doing so, I use the CMS' most recent estimates of the United States Per Capita Cost for fee-for-service enrollees without end-stage renal disease for the relevant year (CMS OACT 2020; 2021).

As a final plausibility check on this estimate, I compare it to a MedPAC (2021a) estimate of plan spending on *all* supplemental benefits other than reduced Medicare premiums and cost-sharing derived from plans' 2021 bids. Those estimates indicate that MA plans are allocating amounts equivalent to 2.9% of per enrollee traditional Medicare spending to these supplemental benefits in 2021.[16] Thus, my estimate of plan spending on dental, hearing, and vision coverage corresponds to around half of all plan spending on these types of supplemental benefits. In light of the fact that dental, hearing, and vision coverage are among the most common and most substantial supplemental benefits in this category (Freed, Biniek, et al. 2021; Friedman and Yeh 2021; MedPAC 2021b), this seems reasonable.

[16] Specifically, MedPAC reports that rebates average 14% of per enrollee traditional Medicare spending in 2021 and that 21% of rebate dollars are allocated to these supplemental benefits: 0.21 x 0.14 = 0.029. I note that the estimate of the share of rebate dollars that are allocated to these supplemental benefits excludes special needs plans. An estimate that included those plans might be somewhat higher (Friedman et al. 2020).

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