

**TITLE**

“Supply-Side Versus Demand-Side Unmet Need: Implications for Family Planning Programs”: A Comment

**SHORT RUNNING HEAD**

Comment: Supply-Side versus Demand-Side Unmet Need

**AUTHOR NAMES**

Mahesh Karra

**AUTHOR AFFILIATIONS**

Frederick S. Pardee School of Global Studies, Boston University, 152 Bay State Road, Room G04C, Boston, MA 02215 (MK)

**AUTHOR LAST NAMES**

Karra

**CORRESPONDING AUTHOR**

Mahesh Karra  
Frederick S. Pardee School of Global Studies  
Boston University  
152 Bay State Road, Room G04C  
Boston, MA 02215  
mvkarra@bu.edu

**FUNDING STATEMENT**

Support for this project was provided by the Program for Women’s Empowerment Research (POWER) at the Boston University Global Development Policy Center through a grant from the William and Flora Hewlett Foundation (Grant No. 2020-1162). The study funders had no role in study design, data collection, analysis, interpretation, or writing of the results.

**COMPETING INTERESTS**

I declare that no competing interests exist, and all errors are my own.

## **“Supply-Side Versus Demand-Side Unmet Need: Implications for Family Planning Programs”: A Comment**

### **Abstract**

I review a study by Senderowicz and Maloney (2022), which proposes an approach to classifying women’s reasons for not using contraception as either being driven by supply-side factors or by a lack of demand. Using Demographic and Health Survey (DHS) data from seven countries, the authors conclude that most unmet need can be attributed to demand-side reasons for non-use. I replicate the analysis and find errors in the authors’ calculations. When corrected, the relative differences between demand-side and supply-side reasons are smaller, and the proportion of women reporting supply-side reasons is larger than demand-side reasons in two countries. In addition, the approach does not account for endogeneity between supply and demand, which cannot be disentangled using cross-sectional data like the DHS. Using longitudinal data, I find that more than 4 out of 5 women with “demand-side unmet need” use contraception after receiving an intervention that reduced supply-side barriers. I discuss the extent of inference gained by these indicators for informing programs, noting that women’s true reasons for non-use may poorly proxied with cross-sectional data, and prioritizing resources based on these reasons would fail to reach a non-trivial proportion of non-users who would have preferred to contracept if access were improved.

### **Introduction**

In a recent study, Senderowicz and Maloney (2022), hereafter referred to as SM 2022, revisit unmet need for contraception, a widely used and controversial indicator in family planning and reproductive health (1). The authors review conceptual criticisms of the indicator and particularly highlight how the current measure identifies those women who wish to space or limit a birth but who also do not want to use contraception (i.e. do not have a demand for contraception) as having an unmet need. With this in mind, the authors propose a modified approach to estimating unmet need which disaggregates the original measure into two mutually exclusive sub-indicators that capture women’s reasons for non-use of contraception as either being driven by a reported lack of access, cost, or other supply-side factors (“supply-side”) or by women’s reported lack of demand for contraception (“demand-side”). Using Demographic and Health Survey (DHS) data from seven Sub-Saharan African countries, the authors estimate that supply-side unmet need accounts for at most a quarter of overall unmet need even under the most expansive definitions of access, with the bulk of unmet need attributed to demand-side factors.

While conceptually appealing, the SM 2022 approach has a number of empirical shortcomings. Most notably, it fails to account for the fact that supply- and demand-side factors are almost surely endogenous in that they are likely to be jointly identified. From an empirical standpoint, supply-side and demand-side drivers of unmet need (and contraceptive use) cannot be easily disentangled when they are simultaneously inferred from observational data like the DHS. For example, a woman who cannot afford to use contraception or who is unable to travel to a provider to receive services (both supply-side reasons for non-use) may report that she does not want to use contraception (a demand-side reason for non-use) because she may be embarrassed to reveal that she cannot afford to or is unable to seek care. Equivalently, if contraception were unavailable or out of reach for other supply-side reasons, then it may become difficult for a woman to determine if she would have a demand for contraception if it were to become accessible; as a result, she may simply report a lack of demand, which is more observable to her, than a supply-side constraint, the true underlying reason behind her non-use. Conversely, one can also imagine cases where women report supply-side reasons for their

non-use (e.g. reporting that it is too costly / time consuming to seek services) when they may, in fact, have no demand for contraception. Moreover, supply-side and demand-side reasons for non-use may both be driven by higher-level determinants of demand and supply (e.g. social norms, service environment factors, etc.). Taken together, the treatment of supply- and demand-side factors of unmet need as if they are observably independent and separable would implicitly assume a women's demand-side reason for non-use through a cross-sectional survey response is a static stated preference, conditional on access and supply factors.

### **An Empirical Test of the SM 2022 Approach**

I assess the validity of the SM 2022 approach using experimental data from Malawi. The test is straightforward: if it were the case that women's reasons for contraceptive non-use are primarily demand-driven, as the authors claim, then a supply-side intervention should have minimal (if any) impact on their decision to not use contraception, unless: 1) women's stated preferences for non-use are weak or ambiguous; 2) cross-sectional measurements of women's stated preferences for contraceptive non-use are poor proxies for women's latent contraceptive preferences, either supply- or demand-side, particularly if preferences are dynamic even over short time periods; 3) supply-side interventions that change the service delivery environment may shape women's demand for family planning (i.e. are "demand generating") on either the extensive (use / non-use) or intensive (type of contraceptive method used) margins; or 4) any combination of reasons 1-3.

In the Malawi study, a two-year supply-side family planning intervention that eliminated cost and access barriers to family planning was distributed to women who were randomly assigned to a treatment arm. Following a baseline survey in 2016, women were offered free transportation and free access to a high quality family planning clinic with low waiting times and that provided a full range of contraceptive methods and family planning services, including: 1) re-supply methods (condoms, pills, injectables, etc.); 2) insertion and removal services for long-acting, reversible methods (IUDs, implants); 3) permanent methods; 4) other related services, including consultations with a trained provider, treatment and coverage for contraceptive-related side effects, etc. Women were re-interviewed annually over three waves, and measures of contraceptive use, fertility and contraceptive preferences, and reasons for non-use of contraception were documented in each wave. Detailed descriptions of the intervention and study design are presented elsewhere (2,3). The data collected from this study offers several key advantages over the DHS. Specifically, I can more effectively decouple the determinants of supply-side and demand-side unmet need by leveraging the experimental variation that is induced by the randomized rollout of family planning. I can also infer the timing of the demand response using the panel data structure, which allows me to assess the stability and strength of the relationships between women's stated preferences at baseline and their subsequently revealed, observable behavior.

### **Results**

I first follow the SM 2022 approach using the same DHS data that the authors analyzed. Table 1 presents weighted descriptive statistics of the reasons for contraceptive non-use among women who were identified to have an unmet need for either limiting or spacing across each of the seven DHS countries; since women could report multiple reasons for non-use, the proportions in the table do not add up to 100 percent. I confirm that across most (but not all) countries, the proportion of demand-side reasons for non-use exceed the proportion of supply-side reasons for non-use. Between 52 to 87 percent of women who were classified with an unmet need (i.e. they wanted to limit or space childbearing by at least 2 years but were not using contraception) reported a demand-side reason for not using contraception. However, I also note that a non-negligible proportion of women classified to have an unmet need also reported supply-side reasons for non-use. In following SM 2022's

definitions, between 3 to 30 percent of women were classified to have a supply-side reason for their non-use under the strictest conception of supply-side unmet need; when using the broadest conception, however, between 37 and 75 percent of women reported a supply-side reason for their non-use. In contrast to SM 2022, I note that a larger proportion of women in Cote d'Ivoire and Kenya reported supply-side reasons for non-use relative to demand-side reasons for non-use. Moreover, a cross-tabulation of reasons for non-use finds that among women with an unmet need, 31.5 percent of women reported only demand-side reasons for non-use, 24.5 percent of women reported only supply-side reasons for non-use, while 8 percent of women reported both a demand-side and a supply-side reason for non-use.

I replicate the approach that I take in Table 1 using baseline data from Malawi. Table 2 presents these results and highlights a starker contrast between supply-side and demand-side unmet need in the Malawi sample, with 82 percent of women reporting a demand-side reason for non-use at baseline (in 2016) compared to less than 6 percent of women reporting a supply-side reason under the broadest definition of lack of access. I focus on the subsample of Malawian women classified with an unmet need for contraception, who initially reported a demand-side reason at baseline, and who were subsequently randomized to the supply-side family planning intervention. In Panel A of Table 3, I present the change in these women's contraceptive use over time. I find that among the women with demand-side unmet need in 2016 and who were randomized to the family planning intervention following the baseline, 83.9 percent of these women were using a contraceptive method in 2017 and 70.5 percent of women were using a contraceptive method in 2018. As a check on these estimates, I calculate the transition to contraceptive adoption following the introduction of the supply-side intervention among the subsample of women who may have more stable (less transitory) demand-side reasons for not using contraception, e.g. they were not breastfeeding nor were postpartum amenorrheic at baseline. I find even higher rates of subsequent contraceptive use among this subsample, with 87.2 percent of women using a contraceptive method after one year of exposure to the intervention and 73.7 percent of women using a method after two years of exposure to the intervention (Panel B of Table 3).

## **Discussion**

I replicate the approach proposed by SM 2022 to calculate the proportion of women who report "demand-side" versus "supply-side" reasons for their non-use of contraception even when they report a preference for spacing or limiting births. My estimates differ from those of SM 2022. Specifically, I find that while the proportion of women reporting demand-side reasons for non-use is generally higher than the proportion reporting supply-side reasons for non-use, the relative differences between these two proportions is generally smaller than what SM 2022 calculated. In contrast to SM 2022, I also note that the proportion of supply-side reasons for non-use is larger than demand-side reasons for non-use in two out of seven countries; these differences might be due to differences in how our approaches respectively allow for women to report multiple reasons for non-use and for both demand-side and supply-side reasons to be reported by the same woman.

I further test the empirical approach proposed by SM 2022 to classify women with either a "demand-side" or "supply-side" unmet need using longitudinal experimental data from Malawi. I find that more than 4 out of 5 women who initially reported demand-side reasons for contraceptive non-use, as classified by SM 2022, and who would have been classified as having "demand-side unmet need," were using a contraceptive method within a year after having been offered an intervention that reduced cost and access barriers to family planning services. These findings show that addressing supply-side barriers to expand contraceptive choice leads to contraceptive uptake even among those women who

may have only or primarily reported demand-side reasons for non-use. If we assume that this contraceptive use is concordant with women's contraceptive preferences, then the findings highlight that women's preferences and demand for contraception evolve dynamically and significantly over a short period of time. In addition, the findings strongly suggest that women's latent determinants of non-use may have been initially misclassified, or at the very least, poorly proxied when using only baseline data. The fact that uptake was so high among women who stated a demand-side reason for non-use provides cautionary evidence against the use of limited cross-sectional data to link women's stated contraceptive preferences to their behavior when such static preference data may simply not be suitable for these types of inference. More generally, the findings highlight the empirical challenges that arise from trying to decouple supply-side drivers of unmet need from demand-side ones even when the conceptual reasons to do so are well-motivated. In the absence of more effective means to rigorously identify women's latent reasons for not using contraception and determine whether these reasons are dynamically stable, programs that simply seek to divide non-users based on their stated reasons for non-use and then prioritize the targeting of resources based on these reasons would likely fail to reach a non-trivial proportion of non-users who would have revealed-preferred to contracept if access were improved.

Even though the empirical approach proposed by SM 2022 falls short of its goals, the conceptual critiques of unmet need and the call for more rigorous measurement in family planning deserve significant attention from the field. As the authors note, "we must seriously reconsider the idea that there is an unmet need...[for those] women who are making conscious and informed decisions not to use family planning methods even when not actively seeking a pregnancy in the next two years." To date, most surveys and data collection efforts that measure key indicators in family planning, including unmet need, are simply not designed to effectively estimate women's underlying fertility and/or contraceptive preferences, even though the elicitation of these preferences are central to the measurement of the indicator. In the absence of more effective and unbiased measures of preferences or demand at the individual level, which come at a cost and require new (and likely dynamic) data collection methods, the use of static, biased proxies for estimating reasons for non-use, demand and unmet need may in fact generate worse inference than not using these proxies to begin with, particularly given the import of these indicators for informing policy and programs.

## References

1. Senderowicz L, Maloney N. Supply-Side Versus Demand-Side Unmet Need: Implications for Family Planning Programs. *Popul Dev Rev*. 2022. DOI:10.1111/padr.12478.
2. Karra M, Canning D. The Effect of Improved Access to Family Planning on Postpartum Women: Protocol for a Randomized Controlled Trial. *JMIR Res Protoc*. 2020 Aug;9(8):e16697.
3. Karra M, Maggio D, Guo M, Ngwira B, Canning D. The causal effect of a family planning intervention on women's contraceptive use and birth spacing. *Proc Natl Acad Sci*. 2022 May 31;119(22):e2200279119.

## Tables and Figures

Table 1: Reasons for non-use of contraception among women who have an unmet need for limiting or spacing in SM 2022 countries

Reason Not Using	ALL		BF 2010		DRC 2013-14		CI 2011-12		KE 2014		NG 2013		TD 2014-15		UG 2016	
	Prop.	N	Prop.	N	Prop.	N	Prop.	N	Prop.	N	Prop.	N	Prop.	N	Prop.	N
Not married	0.021	348	0.004	12	0.04	110	0.029	45	0.063	93	0.008	27	0.007	14	0.023	59
Not having sex	0.064	1062	0.08	234	0.089	245	0.057	88	0.066	98	0.052	176	0.058	112	0.043	111
Infrequent sex	0.145	2406	0.152	445	0.137	377	0.101	155	0.192	284	0.143	484	0.127	246	0.166	427
Menopausal/hysterectomy	0.001	17	0.001	3	0.001	3	0	0	0	0	0	0	0.002	4	0.001	3
Subfecund/infecund	0.021	348	0.009	26	0.031	85	0.017	26	0.02	30	0.018	61	0.018	35	0.034	87
Postpartum amenorrheic	0.087	1443	0.057	167	0.146	402	0.077	119	0.092	136	0.045	152	0.061	118	0.137	352
Breastfeeding	0.224	3716	0.209	612	0.328	903	0.157	242	0.082	121	0.228	771	0.413	800	0.095	244
Fatalistic	0.048	796	0.051	149	0.03	83	0.027	42	0.032	47	0.076	257	0.029	56	0.066	170
Respondent opposed	0.095	1576	0.063	184	0.109	300	0.097	149	0.039	58	0.158	535	0.109	211	0.055	141
Husband/partner opposed	0.112	1858	0.168	492	0.114	314	0.103	159	0.061	90	0.111	376	0.1	194	0.084	216
Others opposed	0.008	133	0.004	12	0.006	17	0.01	15	0.003	4	0.011	37	0.006	12	0.015	39
Religious prohibition	0.037	614	0.017	50	0.054	149	0.03	46	0.027	40	0.071	240	0.046	89	0.004	10
Knows no method	0.056	929	0.028	82	0.045	124	0.11	169	0.012	18	0.08	271	0.134	260	0	0
Knows no source	0.049	813	0.01	29	0.12	330	0.107	165	0.007	10	0.052	176	0.052	101	0.002	5
Fear of side effects/health concerns	0.17	2820	0.141	413	0.16	441	0.202	311	0.362	536	0.153	518	0.072	139	0.193	496
Lack of access/too far	0.023	382	0.051	149	0.028	77	0.027	42	0.006	9	0.019	64	0.007	14	0.01	26
Costs too much	0.04	664	0.107	313	0.042	116	0.031	48	0.014	21	0.024	81	0.022	43	0.011	28
Inconvenient to use	0.014	232	0.008	23	0.015	41	0.018	28	0.009	13	0.03	101	0.004	8	0.009	23
Interferes with body's processes	0.03	498	0.008	23	0.025	69	0.061	94	0.047	70	0.056	189	0.01	19	0.015	39
Preferred method not available	0.009	149	0.002	6	0.02	55	0.015	23	0.01	15	0.009	30	0.008	15	0.004	10
No method available	0.005	83	0.001	3	0.012	33	0.01	15	0	0	0.007	24	0.003	6	0.001	3
Other	0.058	962	0.074	217	0.056	154	0.104	160	0.082	121	0.014	47	0.063	122	0.052	134
Don't Know	0.011	183	0.003	9	0.007	19	0.026	40	0.002	3	0.008	27	0.026	50	0.011	28

### Panel A: Demand-Side vs. Supply-Side Unmet Need, among women with an unmet need (reporting multiple reasons)

Demand side reasons, V3 (black)	0.685	11364	0.622	1820	0.871	2398	0.533	821	0.523	774	0.72	2436	0.817	1582	0.597	1535
Supply side reasons, V1 (red)	0.182	3020	0.199	582	0.267	735	0.3	462	0.049	73	0.191	646	0.226	439	0.028	72
Supply side reasons, V2 (red + blue)	0.360	5973	0.392	1148	0.481	1325	0.472	727	0.203	300	0.392	1326	0.385	748	0.154	396
Supply side reasons, V3 (red + blue + green)	0.574	9523	0.549	1607	0.681	1876	0.753	1160	0.621	919	0.631	2134	0.471	914	0.371	954
<b>Observations, Women with Unmet Need</b>		<b>16591</b>		<b>2927</b>		<b>2754</b>		<b>1539</b>		<b>1480</b>		<b>3383</b>		<b>1937</b>		<b>2571</b>

<b>Panel B: Demand-Side vs. Supply-Side Unmet Need, among women with an unmet need (reporting at least one reason)</b>																
Demand side reasons, V3 (black)	0.395	9709	0.474	1616	0.407	1761	0.295	692	0.344	714	0.404	2117	0.399	1309	0.38	1483
Supply side reasons, V1 (red)	0.100	2458	0.15	512	0.14	606	0.135	317	0.032	66	0.095	498	0.111	364	0.018	70
Supply side reasons, V2 (red + blue)	0.207	5088	0.296	1009	0.256	1108	0.23	540	0.141	293	0.207	1084	0.194	637	0.1	390
Supply side reasons, V3 (red + blue + green)	0.325	7989	0.415	1415	0.345	1493	0.359	843	0.41	851	0.326	1708	0.231	758	0.238	929
<b>Observations, Women with Unmet Need</b>		<b>24581</b>		<b>3410</b>		<b>4327</b>		<b>2347</b>		<b>2075</b>		<b>5239</b>		<b>3281</b>		<b>3902</b>
<b>Panel C: Demand-Side vs. Supply-Side Unmet Need, among all women</b>																
Demand side reasons, V3 (black)	0.075	11364	0.107	1820	0.127	2398	0.082	821	0.025	774	0.063	2436	0.089	1582	0.083	1535
Supply side reasons, V1 (red)	0.020	3020	0.034	582	0.039	735	0.046	462	0.002	73	0.017	646	0.025	439	0.004	72
Supply side reasons, V2 (red + blue)	0.039	5973	0.067	1148	0.07	1325	0.072	727	0.01	300	0.034	1326	0.042	748	0.021	396
Supply side reasons, V3 (red + blue + green)	0.063	9523	0.094	1607	0.1	1876	0.115	1160	0.03	919	0.055	2134	0.052	914	0.052	954
<b>Total Unmet Need</b>	<b>0.177</b>	<b>26944</b>	<b>0.204</b>	<b>3486</b>	<b>0.225</b>	<b>4236</b>	<b>0.236</b>	<b>2374</b>	<b>0.128</b>	<b>3978</b>	<b>0.127</b>	<b>4946</b>	<b>0.187</b>	<b>3313</b>	<b>0.204</b>	<b>3775</b>
<b>Total Observations</b>		<b>152226</b>		<b>17087</b>		<b>18827</b>		<b>10060</b>		<b>31079</b>		<b>38948</b>		<b>17719</b>		<b>18506</b>

**Notes:** Statistics are weighted by sampling weights. Multiple reasons could be provided, so proportions do not add up to 100 percent. Supply-side reasons for non-use that follow the strict definition of access (Version 1) are highlighted in red. The additional reasons for non-use under the more expansive definition of access (Version 2) are highlighted in blue. Additional reasons for non-use that make up the broadest definition of supply-side access (Version 3) are highlighted in green. Ambiguous reasons (“other”, “don’t know”) are not included in the calculations of demand-side or supply-side reasons for non-use.

Table 2: Reasons for non-use of contraception among women who report wanting to limit or space for 2+ years, MFPS Wave 1

<b>Reason Not Using</b>	<b>Prop.</b>	<b>N</b>
Not having sex	0.298	142
Infrequent sex	0.036	17
Subfecund/infecund	0.004	2
Postpartum amenorrheic	0.358	171
Breastfeeding	0.117	56
Fatalistic	0.002	1
Respondent opposed	0.002	1
Husband/partner opposed	0.008	4
Others opposed	0.004	2
Religious prohibition	0.004	2
Knows no method	0.002	1
Knows no source	0.010	5
Fear of side effects/health concerns	0.004	2
Lack of access/too far	0.000	0
Costs too much	0.008	4
Inconvenient to use	0.004	2
Interferes with body's processes	0.002	1
Preferred method not available	0.004	2
No method available	0.004	2
Demand side reasons (black)	0.818	390
Supply side reasons, V1 (red)	0.029	14
Supply side reasons, V2 (red + blue)	0.046	22
Supply side reasons, V3 (red + blue + green)	0.057	27
<b>Observations</b>		<b>477</b>

**Notes:** Multiple reasons could be provided, so proportions do not add up to 100 percent. Supply-side reasons for non-use that follow the strict definition of access (Version 1) are highlighted in red. The additional reasons for non-use under the more expansive definition of access (Version 2) are highlighted in blue. Additional reasons for non-use that make up the broadest definition of supply-side access (Version 3) are highlighted in green.

Table 3: Transitions in contraceptive (non-)use among women with “demand-side unmet need” at baseline (2016) and who are randomized to the supply-side intervention, MFPS Waves 1-3

	2016		2017		2018	
	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.
<i>Panel A: “Demand-Side Unmet Need” – Treatment Arm, Definition 1</i>						
Not using FP	190	100.00	26	16.15	44	29.53
Using FP	0	0.00	135	83.85	105	70.47
Total	190	100.00	161	100.00	149	100.00
<i>Panel B: “Demand-Side Unmet Need” – Treatment Arm, Definition 2</i>						
Not using FP	130	100.00	14	12.84	26	26.26
Using FP	0	0.00	95	87.16	73	73.74
Total	130	100.00	109	100.00	99	100.00

Notes: In Panel A, the sample being analyzed are women who: 1) are classified to have “demand-side unmet need” at baseline (in 2016) as defined by SM 2022 (that is, they report wanting to limit or space births by at least two years, are not using a contraceptive method) and report a “demand-side” reason for their contraceptive non-use; and 2) were randomized to the two-year multicomponent intervention that improved access to family planning services by reducing costs, reducing travel times and wait times, providing access to trained service providers, etc. In Panel B, I narrow the sample to the subsample of intervention women with “demand-side unmet need” from Panel A who did not report breastfeeding or postpartum amenorrhea as a reason for their non-use.