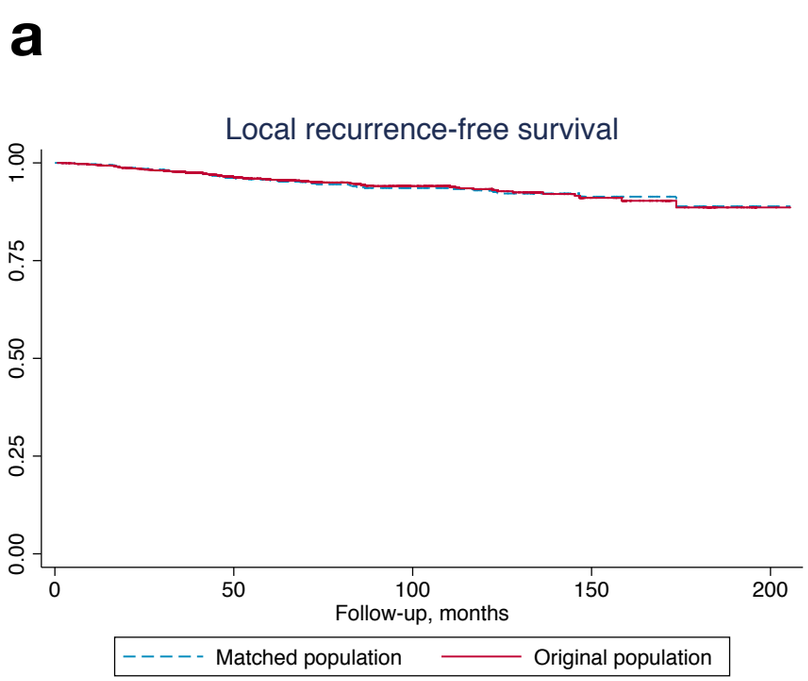
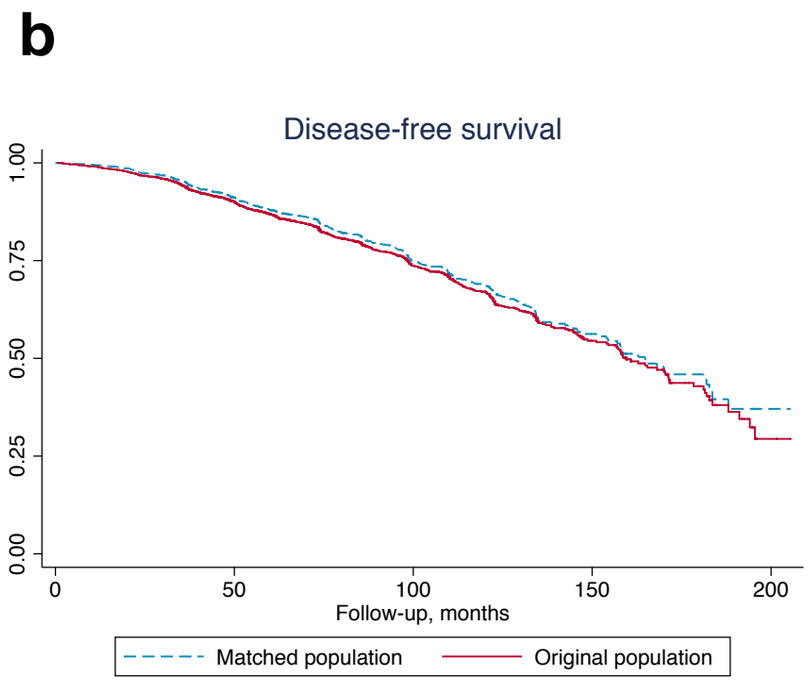
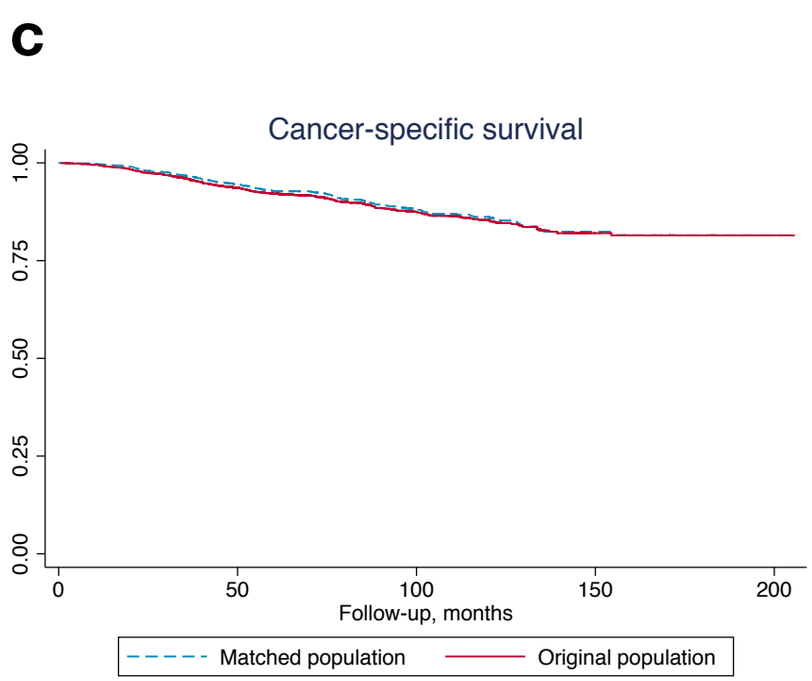
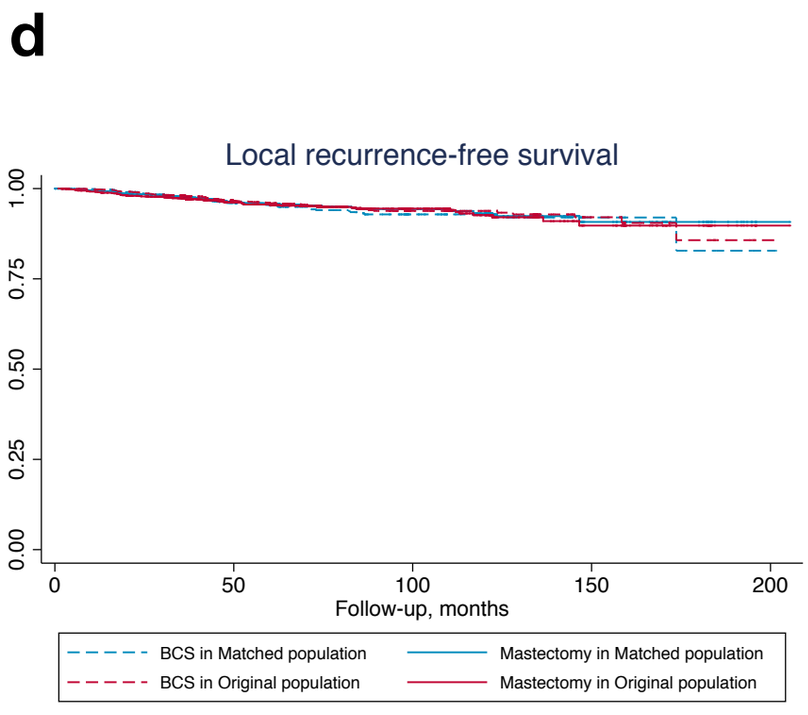
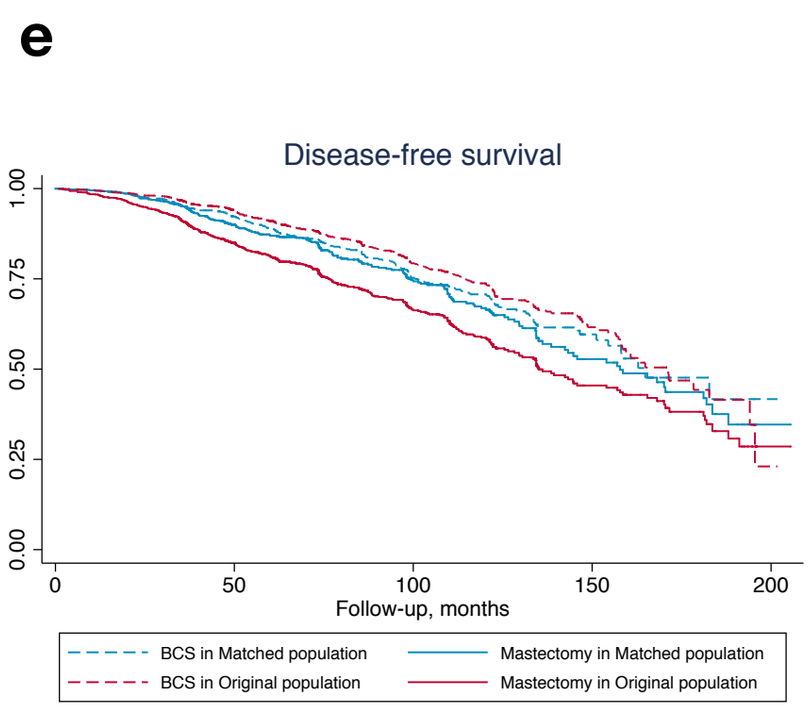
Supplemental Figure 1

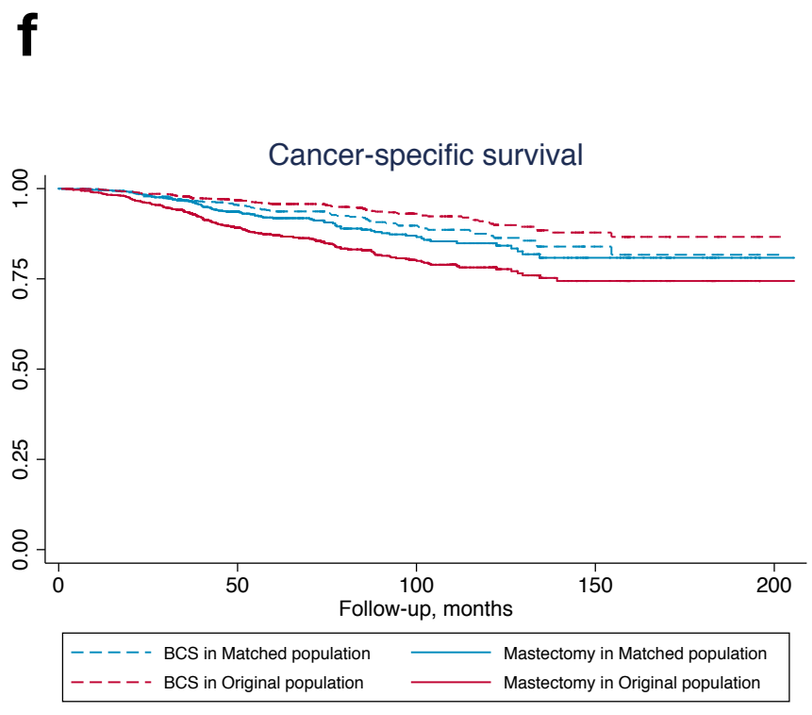






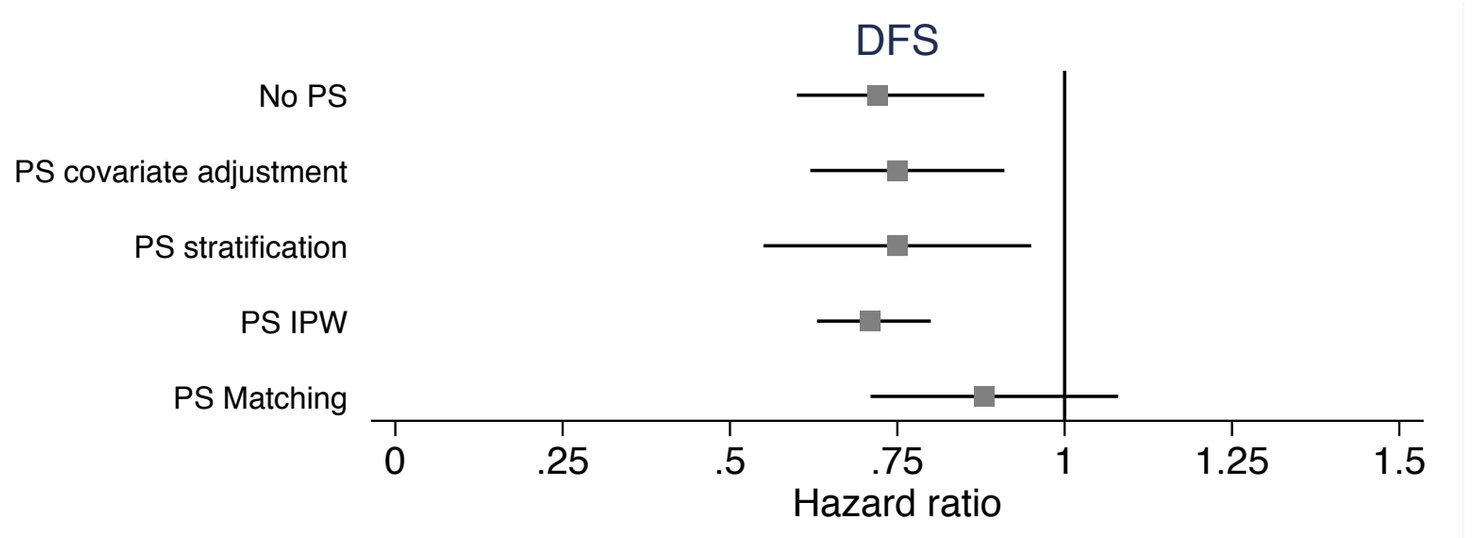




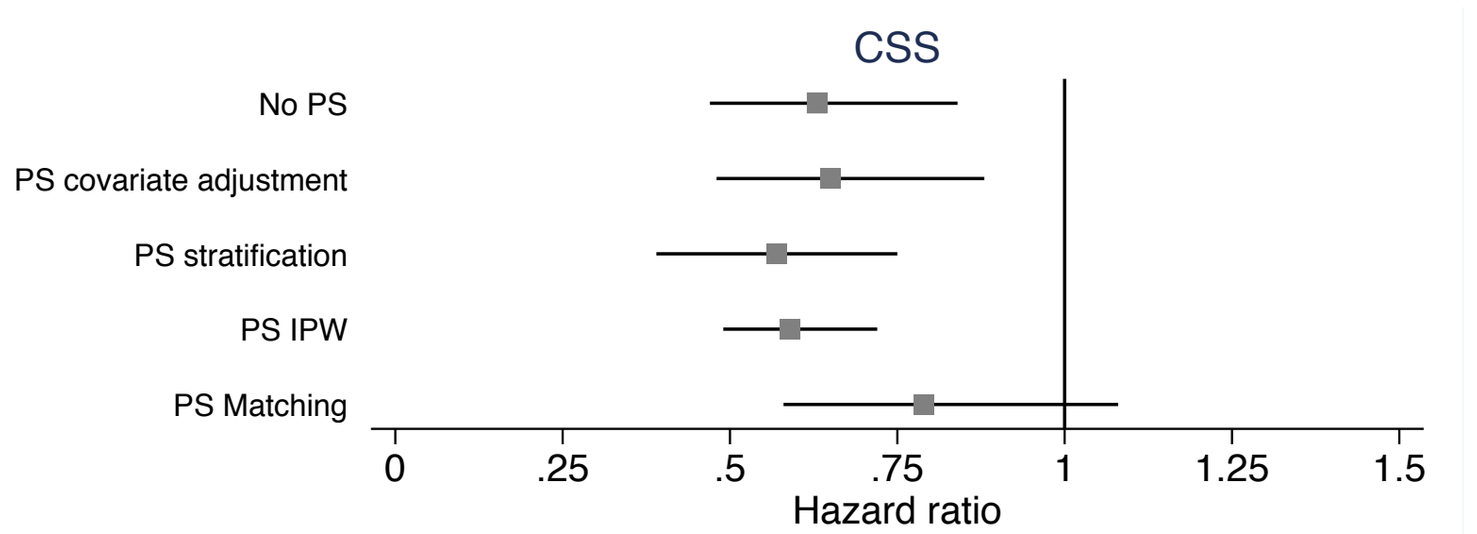


Supplemental Figure 2

a



b



Supplementary File 1

We performed the following PS analysis in the overall population.

1) PS Covariate adjustment. We added PS as a covariate in the multivariate Cox-regression model, so that we can estimate the association between the outcome and the treatment of choice, while adjusting for the probability of receiving the treatment. We observed that BCS (vs. mastectomy) was associated with improved DFS (HR=0.75, 95%CI 0.62-0.91) and CSS (HR=0.65, 95%CI 0.48-0.88) in the overall population.

2) IPW with PS. The rational of IPW with PS was to increases the weights of those patients who received unexpected treatments, which can be thought of as producing additional observations for these patients. For example, a patient would have higher weight if she was suitable for BCS but actually received mastectomy. Thus, we applied weights corresponding to 1/PS and 1/(1-PS) for patients receiving BCS and mastectomy, respectively, during the Cox-regression model. IPW with PS showed that BCS (vs. mastectomy) was associated with improved DFS(HR=0.71, 95%CI 0.63-0.80) and CSS(HR=0.59, 95%CI 0.49-0.72) in the overall population.

3) PS stratification. We split the overall population into 5 strata, as Rosenbaum et al.[2] had shown that 5 strata may be sufficient to reduce the bias by up to 90%. The treatment effects of BCS (vs. mastectomy) was estimated within each stratum. The overall treatment effect was calculated by pooling the treatment effects from different stratum using inverse variance weighting. We observed that BCS (vs. mastectomy) was associated with improved DFS (HR=0.75, 95%CI 0.55-0.95) and CSS (HR=0.57, 95%CI 0.39-0.75) in the overall population.

All of the results estimated by different PS methods were summarized in Figure S2.

Supplemental Table 1, Propensity score model				
	Odds Ratio	95%CI		P
		LL	UL	
T-stage				
T1	1.00			
T2	1.97	1.62	2.40	<0.01
T3-4	8.23	4.62	14.65	<0.01
Tis	0.87	0.55	1.40	0.58
Tx	0.93	0.68	1.28	0.67
N-stage				
N0	1.00			
N1	1.61	1.30	1.98	<0.01
N2	2.76	2.01	3.80	<0.01
N3	5.24	3.44	7.97	<0.01
Nx	5.04	3.25	7.81	<0.01
ER				
Negative	1.00			
Positive	0.74	0.55	0.99	0.04
Unknown	0.51	0.31	0.83	0.01
PR				
Negative	1.00			
Positive	3.19	2.24	4.53	<0.01
Unknown	7.83	5.37	11.40	<0.01
Her2				
Negative	1.00			
Positive	1.18	0.94	1.48	0.14
Unknown	1.17	0.89	1.53	0.25
Histology				
IDC	1.00			
DCIS	1.14	0.68	1.92	0.61
Others	0.79	0.59	1.05	0.10
Grade				
Before 2010	1.00			
After 2010, Grade I	0.46	0.28	0.75	<0.01
After 2010, Grade II	0.58	0.45	0.75	<0.01
After 2010, Grade III	0.55	0.43	0.72	<0.01
After 2010, Unknown	1.43	1.11	1.83	0.01
Age				
<50yrs	1.00			
>=50yrs	1.03	1.02	1.04	<0.01
Chemotherapy				
No chemotherapy	1.00			
Adjuvant chemotherapy	1.42	1.05	1.93	0.02

Neoadjuvant chemotherapy	1.88	1.29	2.73	<0.01
Unknown	1.42	0.87	2.33	0.16
Intercept	0.03	0.02	0.06	<0.01

LL, lower limits of 95% confidence interval; UL, Upper limits of 95% confidence interval;