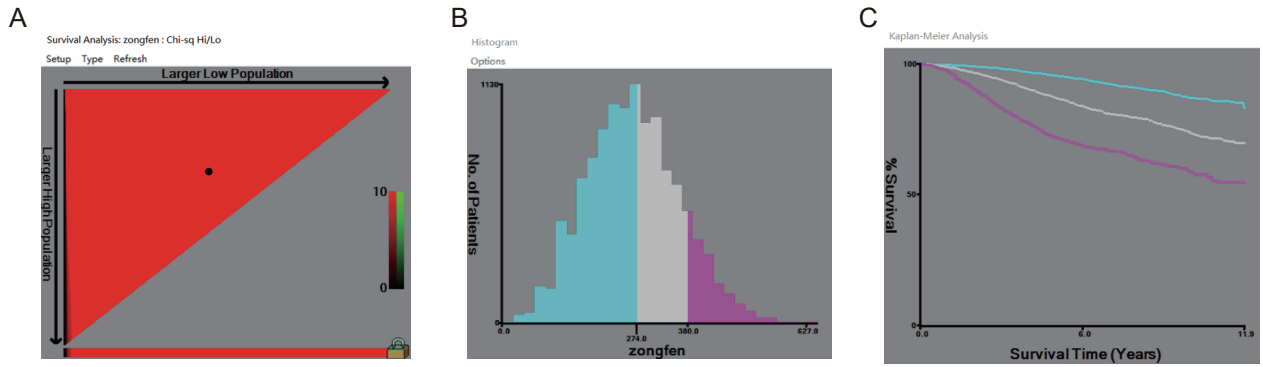
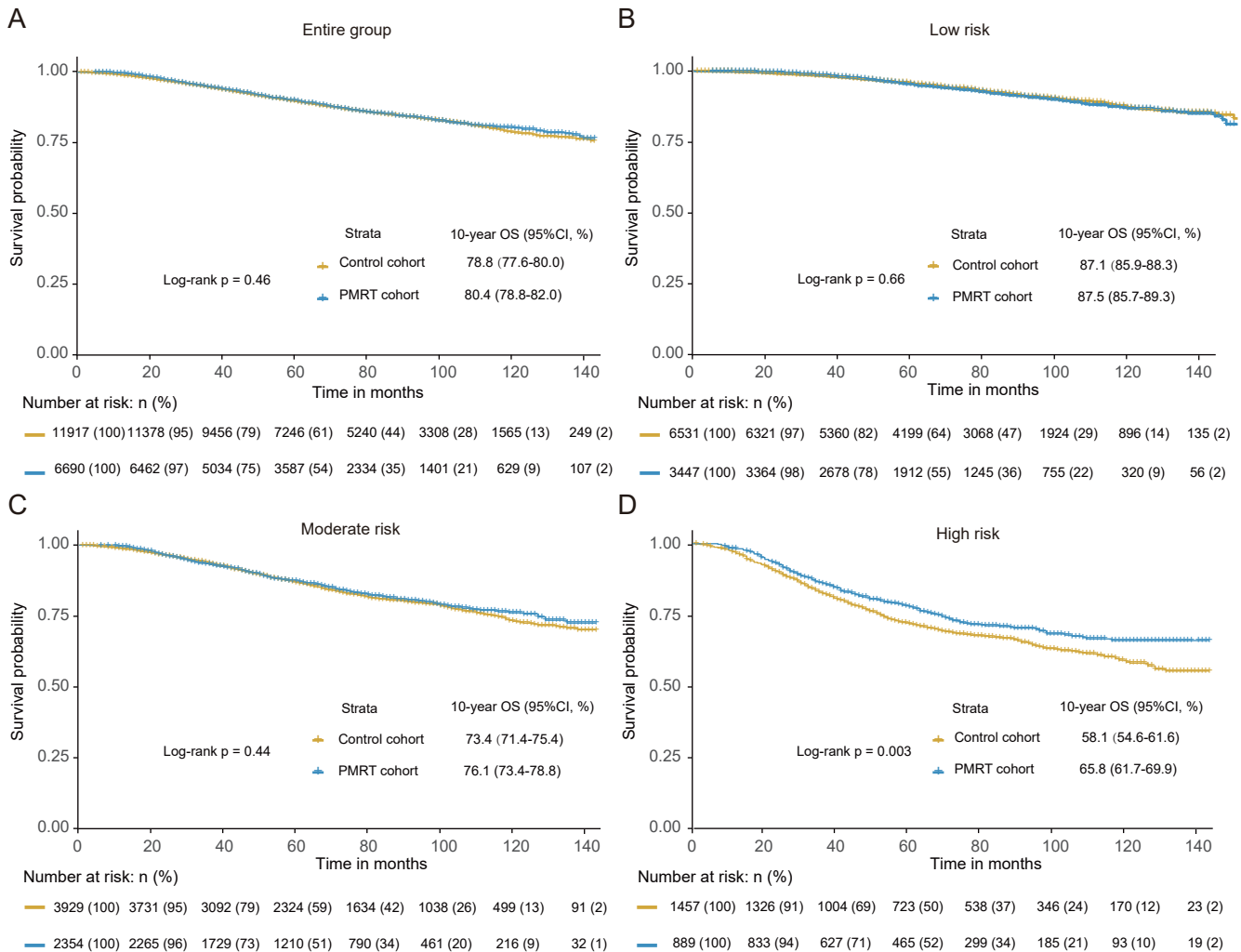


Supplementary Fig. 1. Identification of the optimal cut-offs for T1-2N1M0 breast cancer in non-PMRT cohort using X-tile software.



Supplementary Fig. 2. Kaplan-Meier curves of overall survival between the PMRT cohort and control cohort for the entire group (A), low-risk group (B), moderate-risk group (C) and high-risk group (D) before PSM.



Supplementary Table 1 Demographic and clinicopathologic features of patients between the control cohort and validation cohort in T1-2 breast cancer with 1-3 positive lymph nodes.

Characteristic	Control cohort (11917)	Validation cohort (1110)	P
Marital status			0.082
Married	7761(65.1)	694(62.5)	
USDW	4156(34.9)	416(37.5)	
Age (years)			0.060
20-39	1223(10.3)	130(11.7)	
40-49	3465(29.1)	333(30.0)	
50-59	3908(32.8)	377(34.0)	
60-69	3321(27.9)	270(24.3)	
Race			0.429
White	9333(78.3)	854(76.9)	
Black	1291(10.8)	134(12.1)	
Other	1293(10.9)	122(11.0)	
Histology			0.009
Infiltrating duct cancer	10871(91.2)	1038(93.5)	
Infiltrating lobular carcinoma	1046(8.8)	72(6.5)	
Grade			0.041
1	1578(13.2)	131(11.8)	
2	5172(43.4)	455(41.0)	
3	5167(43.4)	524(47.2)	
Laterality			0.959
Left	6024(50.5)	562(50.6)	
Right	5893(49.5)	548(49.4)	
T stage			0.956
T1	5346(44.9)	497(44.8)	
T2	6571(55.1)	613(55.2)	
Chemotherapy			0.348
No	3259(27.3)	289(26.0)	
Yes	8658(72.7)	821(74.0)	
ALND			<0.001
No	4289(36.0)	266(24.0)	
Yes	7628(64.0)	844(76.0)	
Examined lymph nodes			0.836
Median (IQR)	12(8-17)	12(8-17)	
Positive lymph nodes			0.381
1	6701(56.2)	607(54.7)	
2	3562(29.9)	333(30.0)	
3	1654(13.9)	170(15.3)	
ER			<0.001

	Negative	2350(19.7)	298(26.8)	
	Positive	9567(80.3)	812(73.2)	
PR				<0.001
	Negative	3526(29.6)	426(38.4)	
	Positive	8391(70.4)	684(61.6)	

USDW, unmarried/separated/divorced/widowed; Other, American Indian/AK Native, Asian/Pacific Islander; grade 1, well differentiated; grade 2, moderately differentiated; grade 3, poorly differentiated / undifferentiated; ALND, axillary lymph node dissection; ER, estrogen receptor; PR, progesterone receptor; HER2, human epidermal growth factor receptor 2.

Supplementary Table 2 The baseline characteristics of the patients with PMRT or observation in each risk group before the PSM.

Characteristic	Low-risk group		Moderate-risk group			High-risk group			
	Control cohort	PMRT cohort	Control cohort	PMRT cohort	SMD	Control cohort	PMRT cohort	SMD	
	(6531)	(3447)	(3929)	(2354)		(1457)	(889)		
Marital Status					0.029			0.009	0.007
Married	5117(78.3)	2801(81.3)	2162(55.0)	1317(55.9)		482(33.1)	300(33.7)		
USDW	1414(21.7)	646(18.7)	1767(45.0)	1037(44.1)		975(66.9)	589(66.3)		
Age (years)					-0.22			-0.29	-0.29
					2			2	6
20-39	707(10.8)	549(15.9)	415(10.6)	421(17.9)		101(6.9)	123(13.8)		
40-49	2593(39.7)	1577(45.7)	773(19.7)	562(23.9)		99(6.8)	101(11.4)		
50-59	2343(35.9)	1058(30.7)	1211(30.8)	698(29.7)		354(24.3)	214(24.1)		
60-69	888(13.6)	263(7.6)	1530(38.9)	673(28.6)		903(62.0)	451(50.7)		
Race					0.037			0.020	0.044
White	5166(79.1)	2643(76.7)	3106(79.1)	1830(77.7)		1061(72.8)	607(68.3)		
Black	402(6.2)	251(7.3)	553(14.1)	347(14.7)		336(23.1)	247(27.8)		
Other	963(14.7)	553(16.0)	270(6.9)	177(7.5)		60(4.1)	35(3.9)		
Grade					0.096			0.101	0.055
1	1319(20.2)	496(14.4)	236(6.0)	75(3.2)		23(1.6)	11(1.2)		
2	3355(51.4)	1842(53.4)	1534(39.0)	814(34.6)		283(19.4)	130(14.6)		
3	1857(28.4)	1109(32.2)	2159(55.0)	1465(62.2)		1151(79.0)	748(84.1)		
T stage					0.134			0.088	0.024
T1	4076(62.4)	1688(49.0)	1126(28.7)	467(19.8)		144(9.9)	67(7.5)		
T2	2455(37.6)	1759(51.0)	2803(71.3)	1887(80.2)		1313(90.1)	822(92.5)		
Chemotherapy					0.162			0.246	0.301
No	1386(21.2)	174(5.0)	1269(32.3)	181(7.7)		604(41.5)	101(11.4)		
Yes	5145(78.8)	3273(95.0)	2660(67.7)	2173(92.3)		853(58.5)	788(88.6)		
Examined lymph nodes					-0.03			-0.01	0.001
					4			2	
1-12	2892(44.3)	1644(47.7)	2152(54.8)	1317(55.9)		921(63.2)	561(63.1)		
>13	3639(55.7)	1803(52.3)	1777(45.2)	1037(44.1)		536(36.8)	328(36.9)		
Positive lymph nodes					0.235			0.256	0.239
1	4160(63.7)	1694(49.1)	1994(50.8)	875(37.2)		547(37.5)	246(27.7)		
2	1881(28.8)	1186(34.4)	1249(31.8)	785(33.3)		432(29.6)	227(25.5)		
3	490(7.5)	567(16.4)	686(17.5)	694(29.5)		478(32.8)	416(46.8)		
ER					0.002			-0.01	-0.07
								7	5
Negative	367(5.6)	187(5.4)	1138(29.0)	721(30.6)		845(58.0)	582(65.5)		
Positive	6164(94.4)	3260(94.6)	2791(71.0)	1633(69.4)		612(42.0)	307(34.5)		
PR					-0.00			-0.02	-0.06

	1		2		1	
Negative	824(12.6)	439(12.7)	1647(41.9)	1038(44.1)	1055(72.4)	698(78.5)
Positive	5707(87.4)	3008(87.3)	2282(58.1)	1316(55.9)	402(27.6)	191(21.5)

USDW, unmarried/separated/divorced/widowed; Other, American Indian/AK Native, Asian/Pacific Islander; grade 1, well differentiated; grade 2, moderately differentiated; grade 3, poorly differentiated / undifferentiated; ER, estrogen receptor; PR, progesterone receptor; HER2, human epidermal growth factor receptor 2. SMD, standardized mean difference > 0.10 was marked in bold.