Supplementary materials

Table S1 Optimized solutions obtained through IRM model under different α values when β is 240 × 10^6 CNY

		Wheat (j = 1)						Maize (j = 2)						Cotton (j = 3)					
k	i	$\alpha = 0.82$		$\alpha = 0.83$		$\alpha = 0.84$		$\alpha = 0.82$		$\alpha = 0.83$		$\alpha = 0.84$		$\alpha = 0.82$		$\alpha = 0.83$		$\alpha = 0.84$	
		$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$
VL	QZ	1730	1730	1730	1730	1730	1730	1870	1870	1770	1770	1770	1770	1000	1000	910	910	870	870
VL	FX	2570	2570	2570	2570	2570	2570	2200	2200	2200	2200	2049	2049	1150	0	1150	0	1150	0
VL	GP	1430	1430	1430	1430	1430	1430	1200	1200	1200	1200	1050	1050	650	650	550	550	550	550
VL	CA	2925	2925	2730	2730	2730	2730	1820	1820	1820	1820	1820	1820	2080	2080	2080	2080	1820	1820
VL	WX	2550	2550	2550	2550	2550	2550	2490	2490	2280	2280	2280	2280	174	174	144	144	144	144
VL	CX	1145	1145	1145	1145	1145	1145	1250	1250	1145	1145	1145	1145	118	118	95	95	95	95
VL	LZ	5140	5140	4860	4860	4860	4860	4740	[1082, 3731]	4740	[1083, 3731]	4740	[1083, 3731]	734	734	600	600	600	600
VL	DM	2070	2070	2070	2070	2070	2070	1073	1073	1073	1073	990	990	65	64.5	56	56	56	56
VL	WF	1980	1980	1980	1980	1980	1980	2160	2160	2010	2010	2010	2010	120	120	120	120	120	120
VL	BG	450	450	420	420	420	420	450	450	450	450	420	420	12	12	12	12	6	6
VL	YD	645	645	645	645	645	645	675	675	675	675	630	630	8	0	8	0	8	0
VL	LA	1950	1950	1950	1950	1950	1950	1680	1680	1590	1590	1590	1590	255	255	225	225	225	225
VL	AY	8000	8000	8000	8000	8000	8000	10000	10000	10000	10000	9168	9168	493	493	450	450	450	450
VL	NH	1355	1355	1355	1355	1355	1355	483	483	483	483	437	437	129	129	129	129	90	90
VL	KFQ	270	270	255	255	255	255	270	270	270	270	240	240	0	0	0	0	0	0
L	QZ	1730	1730	1730	1730	1730	1730	1870	1870	1770	1770	1770	[1053, 1770]	1000	[0, 1000]	910	[0, 910]	870	[0, 870]

k	i	Wheat (j = 1)						Maize (j = 2)						Cotton (j = 3)					
		$\alpha = 0.82$		$\alpha = 0.83$		$\alpha = 0.84$		$\alpha = 0.82$		$\alpha = 0.83$		$\alpha = 0.84$		$\alpha = 0.82$		$\alpha = 0.83$		$\alpha = 0.84$	
		$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$
L	FX	2570	2570	2570	2570	2570	2570	2200	[0, 1434]	2200	[0, 1434]	2049	[0, 1283]	1150	0	1150	0	1150	0
L	GP	1430	1430	1430	1430	1430	1430	1200	[0, 1200]	1200	[0, 1200]	1050	[0, 1050]	650	[196, 650]	550	[0, 550]	550	[0, 550]
L	CA	2925	2925	2730	2730	2730	2730	1820	0	1820	0	1820	0	2080	[0, 2080]	2080	[0, 2080]	1820	[0, 1820]
L	WX	2550	2550	2550	2550	2550	2550	2490	2490	2280	2280	2280	2280	174	174	144	144	144	144
L	CX	1145	1145	1145	1145	1145	1145	1250	1250	1145	[994, 1145]	1145	[0, 1145]	118	[0, 118]	95	[0, 95]	95	[0, 95]
L	LZ	5140	5140	4860	4860	4860	4860	4740	0	4740	0	4740	0	734	[0, 734]	600	[0, 600]	600	[0, 600]
L	DM	2070	2070	2070	2070	2070	2070	1073	[0, 1073]	1073	[0, 1073]	990	[0, 990]	65	65	56	[56, 56]	56	56
L	WF	1980	1980	1980	1980	1980	1980	2160	2160	2010	2010	2010	2010	120	120	120	120	120	120
L	BG	450	450	420	420	420	420	450	[0, 450]	450	[0, 450]	420	[0, 420]	12	[0, 12]	12	[0, 12]	6	0
L	YD	645	645	645	645	645	645	675	[0, 675]	675	[0, 675]	630	[0, 630]	8	0	8	0	8	0
L	LA	1950	1950	1950	1950	1950	1950	1680	1680	1590	1590	1590	1590	255	255	225	225	225	225
L	AY	8000	8000	8000	8000	8000	8000	10000	[0, 10000]	10000	[0, 10000]	9168	[0, 9168]	493	493	450	450	450	450
L	NH	1355	1354.7	1355	1355	1355	1355	483	[0, 483]	483	[0, 483]	437	[0, 437]	129	[0, 129]	129	[0, 129]	90	[0, 90]
L	KFQ	270	270	255	255	255	255	270	[0, 270]	270	[0, 270]	240	[0, 240]	0	0	0	0	0	0
LM	QZ	1730	1730	1730	1730	1730	1730	1870	[0, 1870]	1770	[0, 1770]	1770	[0, 1770]	1000	[0, 1000]	910	0	870	0
LM	FX	2570	2570	2570	2570	2570	2570	2200	0	2200	0	2049	0	1150	0	1150	0	1150	0
LM	GP	1430	1430	1430	1430	1430	1430	1200	0	1200	0	1050	0	650	[0, 650]	550	[0, 550]	550	[0, 550]
LM	CA	2925	[0, 2925]	2730	[0, 2730]	2730	[0, 2730]	1820	0	1820	0	1820	0	2080	[0, 1291]	2080	[0, 2066]	1820	0
LM	WX	2550	2550	2550	2550	2550	2550	2490	[0, 2490]	2280	[0, 2280]	2280	[0, 2280]	174	[0, 174]	144	[0, 144]	144	[0, 144]
LM	CX	1145	1145	1145	1145	1145	1145	1250	[0, 1250]	1145	[0, 1145]	1145	[0, 1145]	118	[0, 118]	95	[0, 95]	95	[0, 95]

k	i	Wheat (j = 1)						Maize (j = 2)						Cotton (j = 3)					
		$\alpha = 0.82$		$\alpha = 0.83$		$\alpha = 0.84$		$\alpha = 0.82$		$\alpha = 0.83$		$\alpha = 0.84$		$\alpha = 0.82$		$\alpha = 0.83$		$\alpha = 0.84$	
		$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$
LM	LZ	5140	[0, 5140]	4860	[0, 4860]	4860	[0, 4860]	4740	0	4740	0	4740	0	734	0	600	0	600	[0, 355]
LM	DM	2070	2070	2070	2070	2070	2070	1073	0	1073	0	990	0	65	[0, 65]	56	[0, 56]	56	[0, 56]
LM	WF	1980	1980	1980	1980	1980	1980	2160	[0, 2160]	2010	[0, 2010]	2010	[0, 2010]	120	120	120	120	120	120
LM	BG	450	[0, 450]	420	[0, 420]	420	[0, 420]	450	0	450	0	420	0	12	0	12	0	6	0
LM	YD	645	645	645	645	645	645	675	0	675	0	630	0	8	0	8	0	8	0
LM	LA	1950	1950	1950	1950	1950	1950	1680	[0, 1680]	1590	[0, 1590]	1590	[0, 1590]	255	[0, 255]	225	[0, 225]	225	[0, 225]
LM	AY	8000	[7611, 8000]	8000	[6349, 8000]	8000	[5207, 8000]	10000	0	10000	0	9168	0	493	[0, 493]	450	[0, 450]	450	[0, 450]
LM	NH	1355	1355	1355	1355	1355	1355	483	0	483	0	437	0	129	0	129	0	90	0
LM	KFQ	270	[0, 270]	255	[0, 255]	255	[0, 255]	270	0	270	0	240	0	0	0	0	0	0	0
M	QZ	1730	1730	1730	1730	1730	1730	1870	0	1770	0	1770	0	1000	0	910	0	870	0
M	FX	2570	2570	2570	2570	2570	[2336, 2570]	2200	0	2200	0	2049	0	1150	0	1150	0	1150	0
M	GP	1430	1430	1430	1430	1430	1430	1200	0	1200	0	1050	0	650	0	550	0	550	0
M	CA	2925	0	2730	0	2730	0	1820	0	1820	0	1820	0	2080	0	2080	0	1820	0
M	WX	2550	2550	2550	2550	2550	2550	2490	0	2280	0	2280	0	174	0	144	0	144	0
M	CX	1145	1145	1145	1145	1145	1145	1250	0	1145	0	1145	0	118	0	95	0	95	0
M	LZ	5140	[0, 2698]	4860	[0, 1466]	4860	[0, 325]	4740	0	4740	0	4740	0	734	0	600	0	600	0
M	DM	2070	2070	2070	2070	2070	2070	1073	0	1073	0	990	0	65	0	56	0	56	0
M	WF	1980	1980	1980	1980	1980	1980	2160	0	2010	0	2010	0	120	120	120	120	120	[0, 120]
M	BG	450	[0, 450]	420	[0, 420]	420	[0, 420]	450	0	450	0	420	0	12	0	12	0	6	0
M	YD	645	645	645	645	645	645	675	0	675	0	630	0	8	0	8	0	8	0

k	i	Wheat ($j = 1$)						Maize ($j = 2$)						Cotton ($j = 3$)					
		$\alpha = 0.82$		$\alpha = 0.83$		$\alpha = 0.84$		$\alpha = 0.82$		$\alpha = 0.83$		$\alpha = 0.84$		$\alpha = 0.82$		$\alpha = 0.83$		$\alpha = 0.84$	
		$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$
M	LA	1950	1950	1950	1950	1950	1950	1680	0	1590	0	1590	0	255	0	225	0	225	0
M	AY	8000	[2089, 8000]	8000	[827, 8000]	8000	[0, 8000]	10000	0	10000	0	9168	0	493	0	450	0	450	0
M	NH	1355	1355	1355	1355	1355	1355	483	0	483	0	437	0	129	0	129	0	90	0
M	KFQ	270	0, 0	255	0	255	0	270	0	270	0	240	0	0	0	0	0	0	0
MH	QZ	1730	1730	1730	1730	1730	1730	1870	0	1770	0	1770	0	1000	0	910	0	870	0
MH	FX	2570	[0, 2570]	2570	[0, 2570]	2570	[0, 2570]	2200	0	2200	0	2049	0	1150	0	1150	0	1150	0
MH	GP	1430	[0, 1430]	1430	[0, 1430]	1430	[0, 1430]	1200	0	1200	0	1050	0	650	0	550	0	550	0
MH	CA	2925	0, 0	2730	0	2730	0	1820	0	1820	0	1820	0	2080	0	2080	0	1820	0
MH	WX	2550	[1636, 2550]	2550	[374, 2550]	2550	[0, 2550]	2490	0	2280	0	2280	0	174	0	144	0	144	0
MH	CX	1145	1145	1145	1145	1145	[377, 1145]	1250	0	1145	0	1145	0	118	0	95	0	95	0
MH	LZ	5140	0	4860	0	4860	0	4740	0	4740	0	4740	0	734	0	600	0	600	0
MH	DM	2070	[0, 2070]	2070	[0, 2070]	2070	[0, 2070]	1073	0	1073	0	990	0	65	0	56	0	56	0
MH	WF	1980	[0, 1980]	1980	[0, 1980]	1980	[0, 1980]	2160	0	2010	0	2010	0	120	[0, 120]	120	[0, 120]	120	[0, 120]
MH	BG	450	0	420	0	420	0	450	0	450	0	420	0	12	0	12	0	6	0
MH	YD	645	[0, 645]	645	[0, 645]	645	[0, 645]	675	0	675	0	630	0	8	0	8	0	8	0
MH	LA	1950	1950	1950	1950	1950	1950	1680	0	1590	0	1590	0	255	0	225	0	225	0
MH	AY	8000	[0, 6180]	8000	[0, 4917]	8000	[0, 3776]	10000	0	10000	0	9168	0	493	0	450	0	450	0
MH	NH	1355	[0, 1355]	1355	[0, 1355]	1355	[0, 1355]	483	0	483	0	437	0	129	0	129	0	90	0
MH	KFQ	270	0	255	0	255	0	270	0	270	0	240	0	0	0	0	0	0	0
H	QZ	1730	[0, 1730]	1730	[0, 1730]	1730	[0, 1730]	1870	0	1770	0	1770	0	1000	0	910	0	870	0

k	i	Wheat (j = 1)						Maize (j = 2)						Cotton (j = 3)					
		$\alpha = 0.82$		$\alpha = 0.83$		$\alpha = 0.84$		$\alpha = 0.82$		$\alpha = 0.83$		$\alpha = 0.84$		$\alpha = 0.82$		$\alpha = 0.83$		$\alpha = 0.84$	
		$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$
H	FX	2570	0	2570	0	2570	0	2200	0	2200	0	2049	0	1150	0	1150	0	1150	0
H	GP	1430	[0, 1068]	1430	0	1430	0	1200	0	1200	0	1050	0	650	0	550	0	550	0
H	CA	2925	0	2730	0	2730	0	1820	0	1820	0	1820	0	2080	0	2080	0	1820	0
H	WX	2550	[0, 2550]	2550	[0, 2550]	2550	[0, 2550]	2490	0	2280	0	2280	0	174	0	144	0	144	0
H	CX	1145	[0, 1145]	1145	[0, 1145]	1145	[0, 1145]	1250	0	1145	0	1145	0	118	0	95	0	95	0
H	LZ	5140	0	4860	0	4860	0	4740	0	4740	0	4740	0	734	0	600	0	600	0
H	DM	2070	[0, 2070]	2070	[0, 1876]	2070	[0, 735]	1073	0	1073	0	990	0	65	0	56	0	56	0
H	WF	1980	0	1980	0	1980	0	2160	0	2010	0	2010	0	120	0	120	0	120	0
H	BG	450	0	420	0	420	0	450	0	450	0	420	0	12	0	12	0	6	0
H	YD	645	0	645	0	645	0	675	0	675	0	630	0	8	0	8	0	8	0
H	LA	1950	[0, 1950]	1950	[0, 1950]	1950	[0, 1950]	1680	0	1590	0	1590	0	255	0	225	0	225	0
H	AY	8000	0	8000	0	8000	0	10000	0	10000	0	9168	0	493	0	450	0	450	0
H	NH	1355	[0, 1355]	1355	[0, 1355]	1355	[0, 1355]	483	0	483	0	437	0	129	0	129	0	90	0
H	KFQ	270	0	255	0	255	0	270	0	270	0	240	0	0	0	0	0	0	0
VH	QZ	1730	0	1730	0	1730	0	1870	0	1770	0	1770	0	1000	0	910	0	870	0
VH	FX	2570	0	2570	0	2570	0	2200	0	2200	0	2049	0	1150	0	1150	0	1150	0
VH	GP	1430	0	1430	0	1430	0	1200	0	1200	0	1050	0	650	0	550	0	550	0
VH	CA	2925	0	2730	0	2730	0	1820	0	1820	0	1820	0	2080	0	2080	0	1820	0
VH	WX	2550	0	2550	0	2550	0	2490	0	2280	0	2280	0	174	0	144	0	144	0
VH	CX	1145	0	1145	0	1145	0	1250	0	1145	0	1145	0	118	0	95	0	95	0

k	i	Wheat ($j = 1$)						Maize ($j = 2$)						Cotton ($j = 3$)					
		$\alpha = 0.82$		$\alpha = 0.83$		$\alpha = 0.84$		$\alpha = 0.82$		$\alpha = 0.83$		$\alpha = 0.84$		$\alpha = 0.82$		$\alpha = 0.83$		$\alpha = 0.84$	
		$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$	$PT_{jt}^{\pm}$	$PX_{jth}^{\pm}$
VH	LZ	5140	0	4860	0	4860	0	4740	0	4740	0	4740	0	734	0	600	0	600	0
VH	DM	2070	0	2070	0	2070	0	1073	0	1073	0	990	0	65	0	56	0	56	0
VH	WF	1980	0	1980	0	1980	0	2160	0	2010	0	2010	0	120	0	120	0	120	0
VH	BG	450	0	420	0	420	0	450	0	450	0	420	0	12	0	12	0	6	0
VH	YD	645	0	645	0	645	0	675	0	675	0	630	0	8	0	8	0	8	0
VH	LA	1950	0	1950	0	1950	0	1680	0	1590	0	1590	0	255	0	225	0	225	0
VH	AY	8000	0	8000	0	8000	0	10000	0	10000	0	9168	0	493	0	450	0	450	0
VH	NH	1355	0	1355	0	1355	0	483	0	483	0	437	0	129	0	129	0	90	0
VH	KFQ	270	0	255	0	255	0	270	0	270	0	240	0	0	0	0	0	0	0