

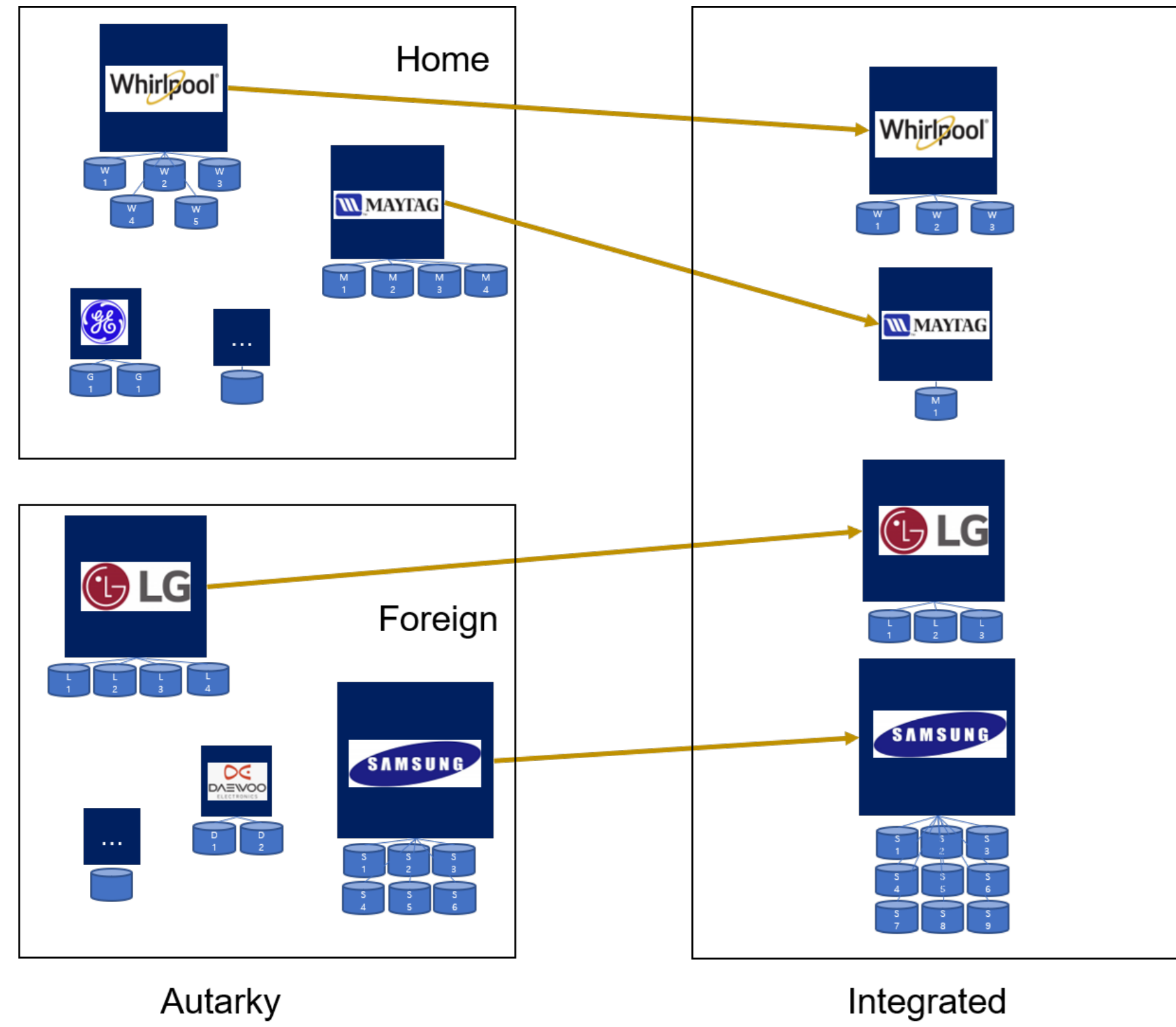
1] dg #Hj c ; f j aWg b d [?ciZgcVi dcVal gVYZj cYZg>ZiZgd\ZcZdj h: hXgZiZ <gb hl 1]

Cj a eaZ 9dci e j dj hKVgZi Zh

= nj > nj c A b
Zi Vi iViZ J c kZgHn

BVX \gdj cY C di kVi dc

- > yL s-Ln, ~, ~ &AL > s, ~
- "-": HYB, ~, NN "Lsn-L" > "HPLS ... HYB"
- "-L-%LB" :L, ~
- & EL' > yY... N>... HYB
- /: HYB > nL > HW% L-



Autarky Integrated

HZhZVgJ Gj Zhi dc

Z, E, H, H96L L T' } %HQL~ > LHs... HYB cS¥ pL'L, nL-L, Y%oL%o ~%o, "pL" > yL s-Ln, ~ AL'ELL-% } L' sB LB ~, } sL%o s-L' ~, ~ > HL E pL ~ pL¥ } > s > s, E... HYB cS¥ > %a-LHs > y > y¥ %a ~ Y~

1] hFVeZg

- Awb CL
- * Y L' sB > L... > ~, N) > yL s-Ln, ~ s > B' > ~ s-HS-HY > T' } %HLS... ~ } > yY... N>... HYB > H... HYB > nL s-pL %a ~ Y-
- > Y s-n z L> H, pL> HB } :L, ~ } > s-n pL s-Ln > LH } > yL ... B } :L CL
- " :L ~, ~ } > ~, -n pL pL%o... HYB CL T' } %N... L> Bp LB ~, } Y
- CL' cS E
- %o > "
- > %o > " LE, y * L%kH f13/L } > H } ~, ~ %B' } :Ls ~
- / LT-s-n pL B-BL... N) > yL s-Ln, ~ s-pL %a ~ Y- f sLH... HYB cS¥ * Y-BL' s-s-Y * L' s-L' %o
- H / > " 1 Y > ~ > CL > > %¥ sp pL -LE ¥ HLT-LH %a ~ Y-L-cs, ~ } L- N) > yL s-Ln, ~
- " } :L } L- ~ n... B } :L CL s-Ln > LH } > yL

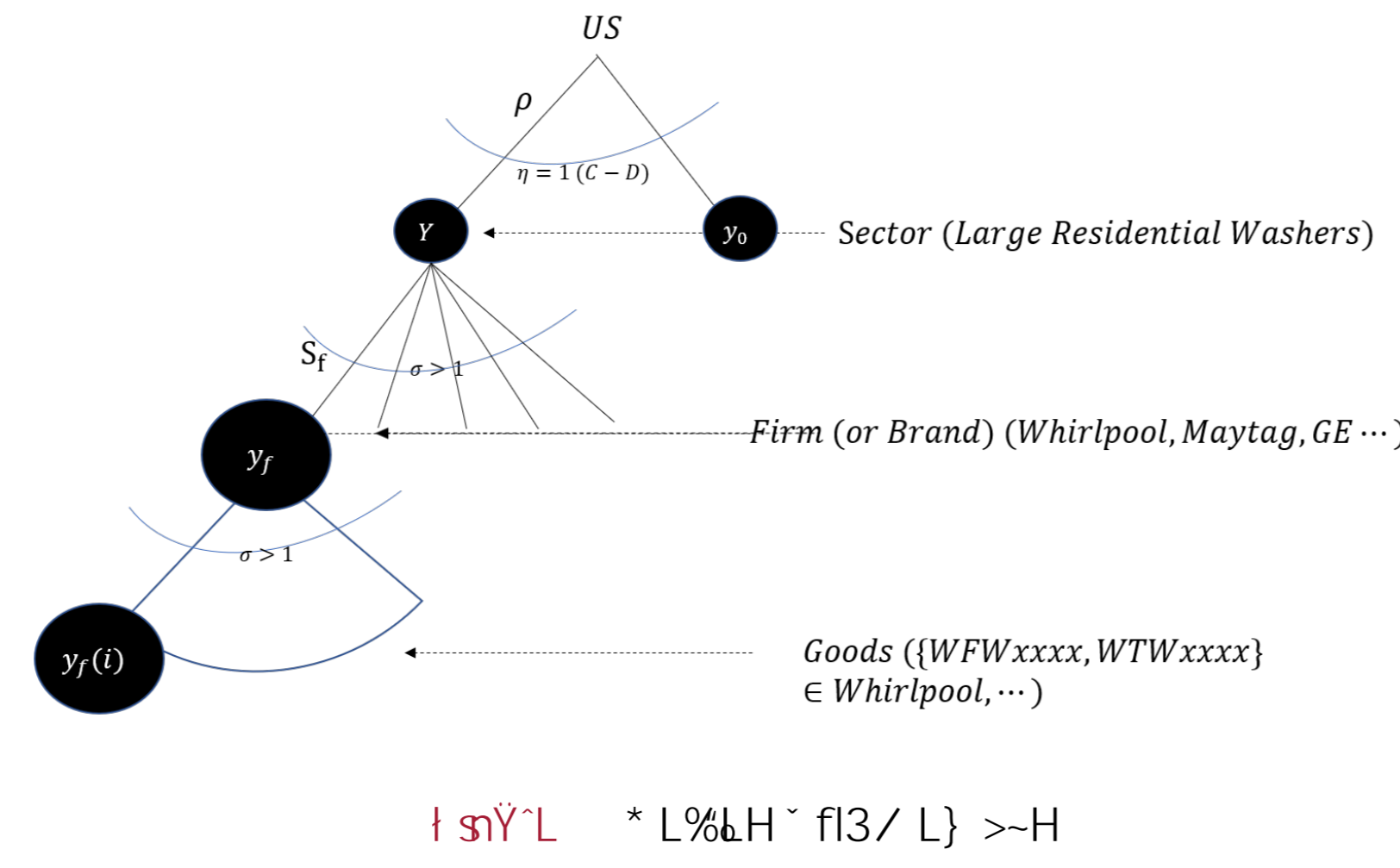
9dcigWj i dc

- 5p% E, y nSCL% > sHL > A, Y' > B' > AL T' } LCL, ... } > ss L%N pL'L, nL-L, Y%oL%o L T' } %o, HYBs-n } Y ... L... HYB%
- / sBL'L Z' > Y > f s } %o, ~ -Y, Y%o } %o-L, } L> %o LH
- f, BY%on, ~ " > ~ %o, ~ C%o d, BY%on, ~ L f Y s A s' }
- f sLH... HYB cS¥ > " pL } } L-, N) > yL s-Ln, ~ C%o * LE > ~ H } > %o ~ } L-
- : L B ~ TnY L, Y' p, E " pL %a L' %o > HW% pLS } > yY... %o-H ... HYB > nL %o " pL } } L-, N) > yL s-Ln, ~

C dYZai ig Xij g

- f) ... ¥ LH * pL nL-L > N > LE, y s f L L-%o > ~ H } >
- "-Ln" > ~ AL' ELL-% } L' sB } > yL %o
- 3L, NT' } LCL... HYB cS¥ "L- B > B' %Lns-%o
- = L, sLAL'n > HL " > %o " > ~ B %o > H' L' T' sLH %N L... ~ n-n, H%o
- f sLH E > nL w = 1 ~, ~ %L E s p % } L' sB s Y

: Zb VcY fl i j ean



- > %o s-HL } > H%o-H/ s s 3 ns } :sL s-HL %o
- Z L' L, nL-L, Y%oL%o
- $Y = I \frac{p_f}{p} = R \frac{p_f}{p} > H P = \frac{h_p}{r} (P_f)^{-1} i^{-1}$
- Z L' T' }
- $y_r = I \frac{p_f^{-1}}{P_f} > H P_f = \frac{h_r}{r} (P_f(i))^{-1} di^{-1}$
- 3Y... ¥ %HL
- Z, } nL-L, Y%oL%o, ~ 23 L Bp ~, nY E sp > Y-s, N > A, P0 = 1 * Y } L' sL > H P0 y0 = 1 > %w = 1
- Z L' L, nL-L, Y%oL%o, ~ Z L' L, nL-L s ¥ ... HYB cS¥ f
- %o } ... %o
- 3¥ } L' sB L Bp > B' %o, HYB %o, ... HYB s-HL % (i) f sLH B %N L... > Hs-n > Y-s > nL, N... HYB (K1)
- pL' T' } %o, T' N-B, ~
- $f = N_f P_f i - \frac{1}{f} y_f i - w K_1 N_f$
- Z L' T' } %o... } > Bp, sL %o
- / sL P_f i = \frac{1}{f} \mu_f = \frac{1}{f} \frac{f}{f-1} E p L L f = + (1 -) S_f
- /, HYB 2 > nL N_f = \frac{1}{f-1} \frac{f-1}{f} S_f

OZgd#9j id Fgd i O9F Z9dcY f dc

- f sLH B %o (K1) ~, ~ n M_e L- " > %o > ~ LB ~, } ¥, ~ ¥... HYB CL M_o (< M_e) T' } %o cSCL > H... HYBL
- 3, ~ n... HYB cS L%o > HL %L-Hs-n, HL' 1 > 2 > ... > M_e "pL" > yL } B ~ AL %o } > sLH sL
- $f = 0 \text{ and } S_f > 0 \text{ for } f = 1, \dots, M_o$
- $f = 0 \text{ and } S_f = 0 \text{ for } f = M_o + 1, \dots, M_e$
- = / B -Hs, ~ nsL %pL L L } L- %o N' pL " pL %a H } > ns > T' }
- 5p L %a H... HYB cS¥ ZCP = M_o
- > yL %a L, N > > ns > T' } S^ZCP = S_{M_o}

1] Z C db Zci d [C Vg Zi ?ciZ\gMi dc H i] dg #g c Z

- s > L' > 5 > HL AL' ELL-% } L' sB LB ~, } sL %o
- &AL > sLH } > yL %a L / W = 2I
- * , > ~ H, ... HYB cS¥ > %o ~ } L-
- L- " > ~ %o " pL sLH } > yL } > s > s " pLS, E... HYB cS¥ > %o ~ LHs > y > y¥
- * , -LE L- " > ~
- 3Y cS, ~ %o > y > y¥ ALB } L pL, ~ ¥ L- " > ~ %o N' pL s-Ln > LH } > yL

1] dg #g c ; f j aWg b

- " } } L-, N' pL } > yL s-Ln, ~ N, } " > HL sL > s, ~
- M_o^W = 2 M_o T' } %o cS s-n s > y > y¥, N %o } L' sB LB ~, } sL % (i)
- f sLH T' } LCL... HYB cS¥
- > yL %a L, N' pL s-Ln > LH } > yL / W (= 2I)

5pL L' > H * > %o L f Y s A s' }, N' > HL sL > s, ~ s " pL %a ~ Y-B ~ %o %o N

- %o, Ns-N } > ~ A, Y' " pL = / B -Hs, ~ s " pL pL'L, nL-L, Y%o %B' } { S^W, ZCP, W, ZCP }
- CLB', ~, N' pL, ... } > s ¥ %a AY " pL M_o^W %o cS s-n T' } %o " pL s-Ln > LH } > yL s-BYHs-n pL ... sL, N > c > s ¥ " pL > nL, N c > sL %o > H " pL T' } LCL } > yL %a L { P_f i, N_f, S_f }_{f=1}^M_o > H
- %B', > ... sL s-HL % E s p s " pL s-Ln > LH LB ~, } ¥ P

E p s p %o CL %A, " p Y c ¥ > H... T' } > s s > ~ %o Y' > ~ L, Y %¥

Gj Vci fVi kZ 7cVanh #?ci gYj Xi dc

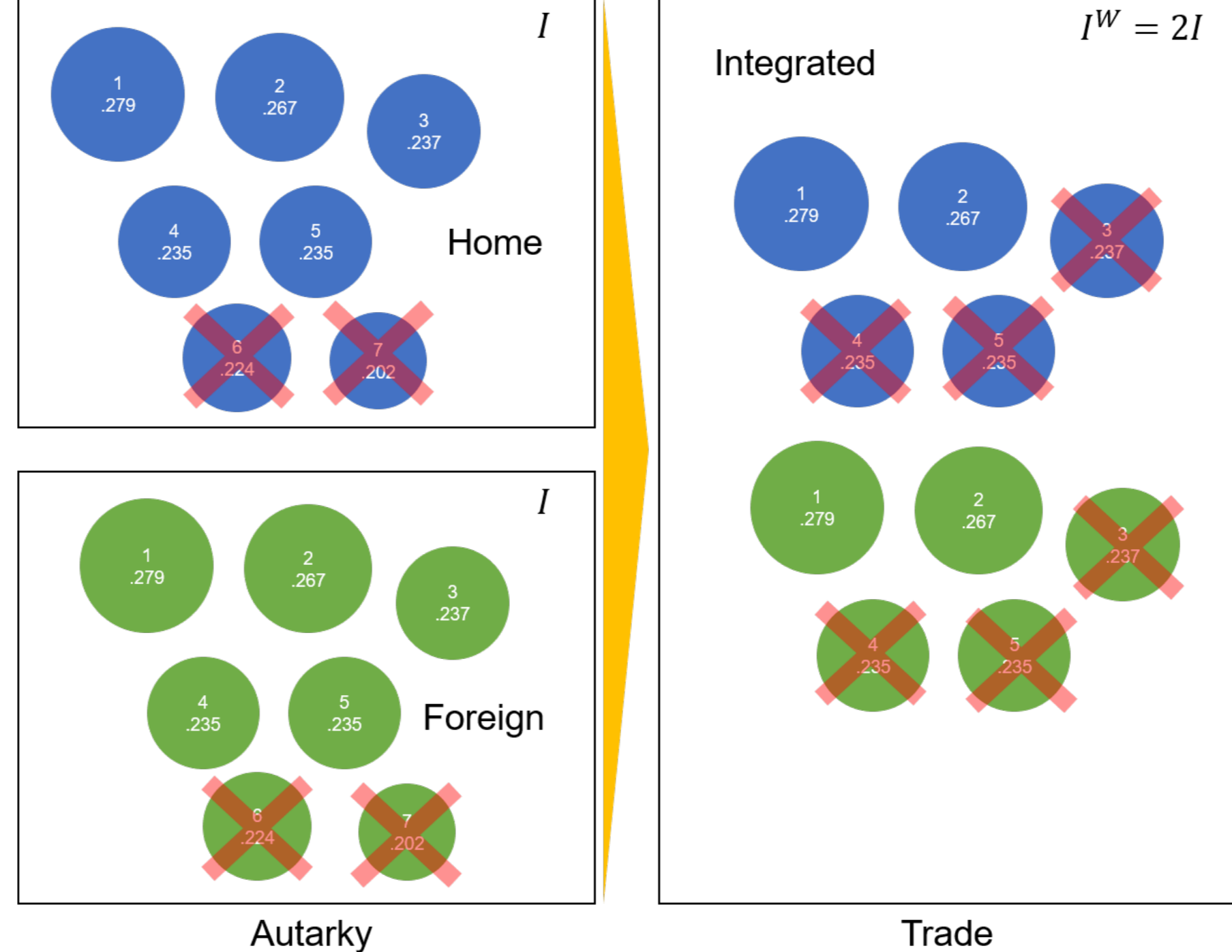
- / sBL'L > ~ H pL'L, nL-L, Y%oL%o } %o 7 > c > s Ass ¥, L } ... ¥ " pL & E, N & nL * Y } AL' %o & & "
- * , > > ¥ B > B, %LH N' } %o Y, ~
- * , ~ %o, ~ > ¥ %a ~ " Y-L f Y s A s' }
- fLCL-s " pL %a ... L %L > s Y %on %o } L' sB LB ~, } sL %o s%o, " > AL, nL > B, %LH N' } , NT' } LCL, ... } > s L %o
- 1 Y > ~ " > CL > > ¥ %o * Y } L' sB > ¥ L... , s-n p, E > ~ s-HS-HY > T' } > HW% pLS, ... } > s L %o " pL %a ~ " Y-, N) > yL s-Ln, ~
- Z, E
- L-Bp } > y L... sB > ~, N' pL } > yL s-Ln, ~ s " pL ... Les Y%oL' > Y L * LE... HYB cS¥ > %o ~ } L- " > " pL ALns-s-n, N) > yL s-Ln, ~
- Y-L' N-B Y > f Y > ~ > CL > > ¥ %o sp pL ~, CL B-BL... %o N' pL } > yL s-Ln, ~

Gj Vci fVi kZ 7cVanh FgdXZhh

- f, ~, ELH " pL } L Bp > ~ %o > ~ H' L CL > ~ " ... > } L' L %o f L L-%o > ~ H } >
 - 5pL B-CL, ~ > nL-L > ... BLH Y L, T-HL f Y s A s' } s " pL n' > Y > T' } %o E sp } Y ... L... HYB %o > LE, y
 - L Bp > ~ %o f s-Hs-n " pL } > ns > T' } %o N s-n " pL = / B -Hs, ~
 - 5pL, EL %o > H Y-s Y L -Y } AL' N^ZCP s " pL... HYB cS¥ %o, %o %¥
- $$S(\rho) = 1 - \frac{f}{f-1} \frac{2}{ZCP} \frac{3}{f-1} \frac{5}{ZCP-1}$$
- E p L L
- If $f > 1$, then $S_f = 0$
- /, HYB cS¥ %o > ~ H' L CL > ~ " ... > } L' L %o
 - = 6 > H K1 = 5
 - f sLH %B' > %o > L HYL, " pL " / %o > " pL "... LCL HL } > H
 - R = 1 = 1000 s > y > y > H R^W = 1^W = 2000 s " pL s-Ln > LH } > yL

1] j k kdgh c ; f j aWg b H i %i] Z c Z i XdcXZei Z

7-sL " pL ... L c s Y %o s L' > Y L EL B ~ T-H " p > " pL = / B -Hs, ~ %o Y... H s L H L %o ~ n s T' } LCL Bp > nL %o > > yY... > H... HYB > nL



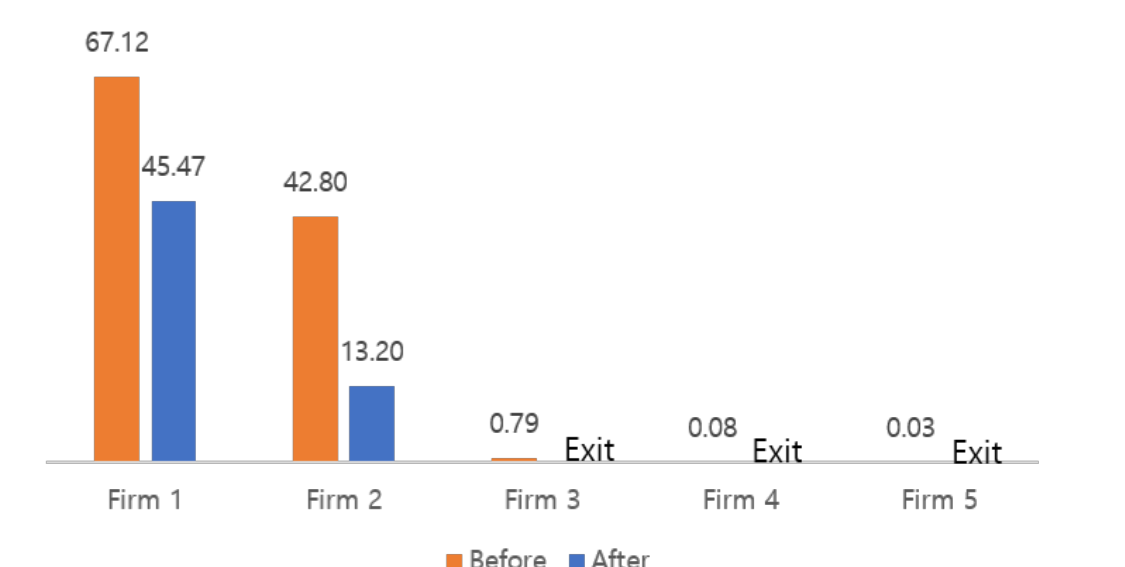
f sLH f f Y s A s' } s " pL 3p, ~ Y-, N) > yL &AL > s, ~

Dj b ZgXVaHZhj a h

- > yL %a L %o
- $$S_f = S(\rho) = 1 - \frac{\rho}{-1 + \frac{1}{1-S^ZCP}(\rho)^{-1} - (-1)}$$
- z s p L' ... HYB CL T' } %o > nL' } > yL %a L %o
 - z L > H, pL > HB } :L, ~ E s p %o } L' sB... HYB CL N Lsn-T' } %o 5 > ~, N N Y' %o cS %o E, %o cS %o L-Bp LB ~, } ¥ E s p, EL' } > yL %a L %o / LBL %on > L, N) > yL %a L i s } %o i s } %o
-

Dj b ZgXVaHZhj a h I9dci Y Z

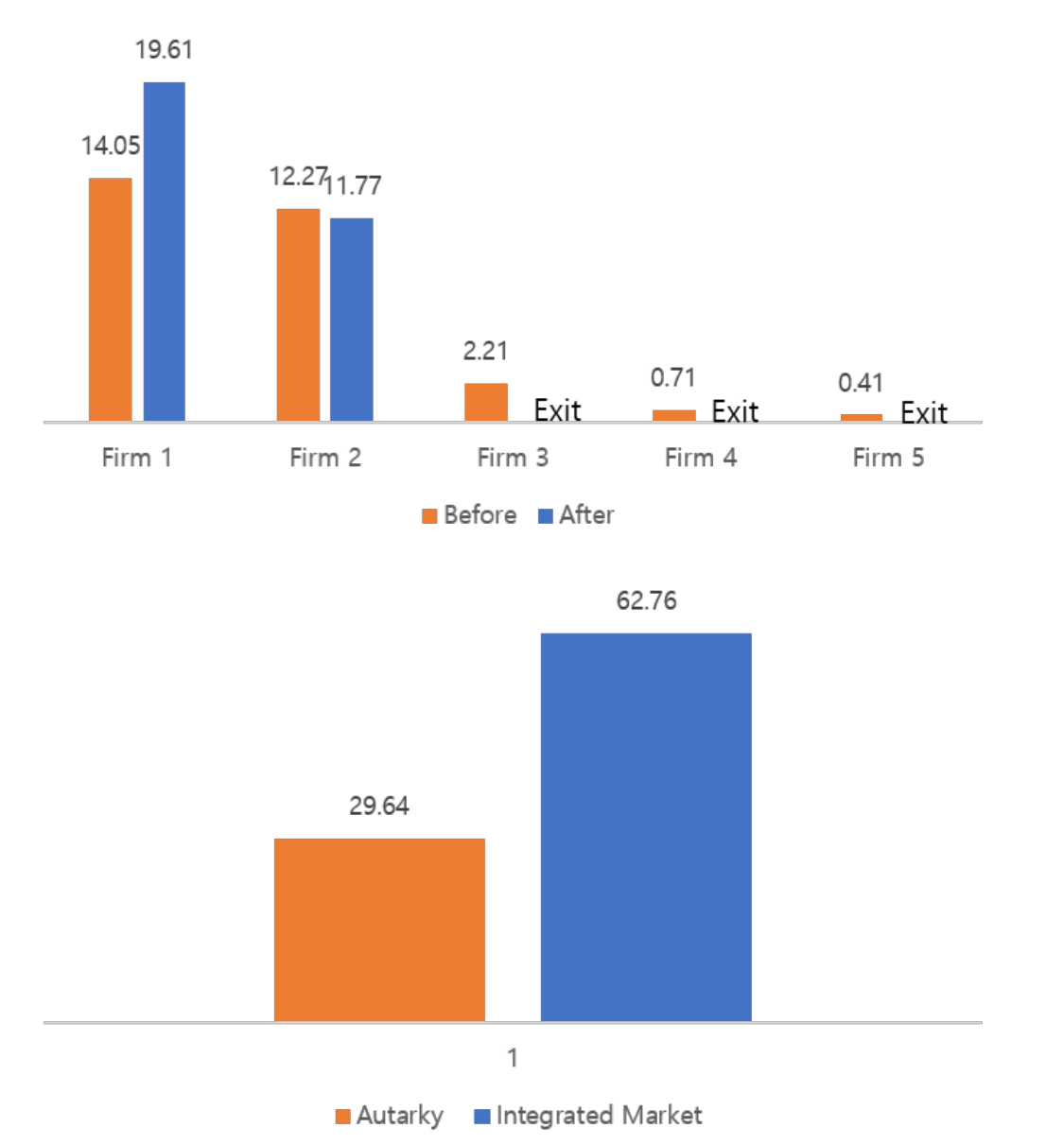
- /, T' %o
- $$r = (r) = \frac{(S(r))^2}{1 + (-1)(1-S(r))R}$$
- z s p L' ... HYB CL T' } %o > ~ %o, L... T' %o
 - 5E, ... %L L OLB %o ~ ... T' * , ... , ~ > ~, " pL } > yL %a L & > nL' } > yL %a L (R) N_f
 - 3) > L' } > yL %a L (S_f) r
 - " p %a } ... L, N... HYB cS¥ %o N' > %o cS %o



- 2 > nL, N', HYB %o

$$N_f = \frac{2}{K_1} \frac{1}{-1} \frac{f-1}{f} S_f$$

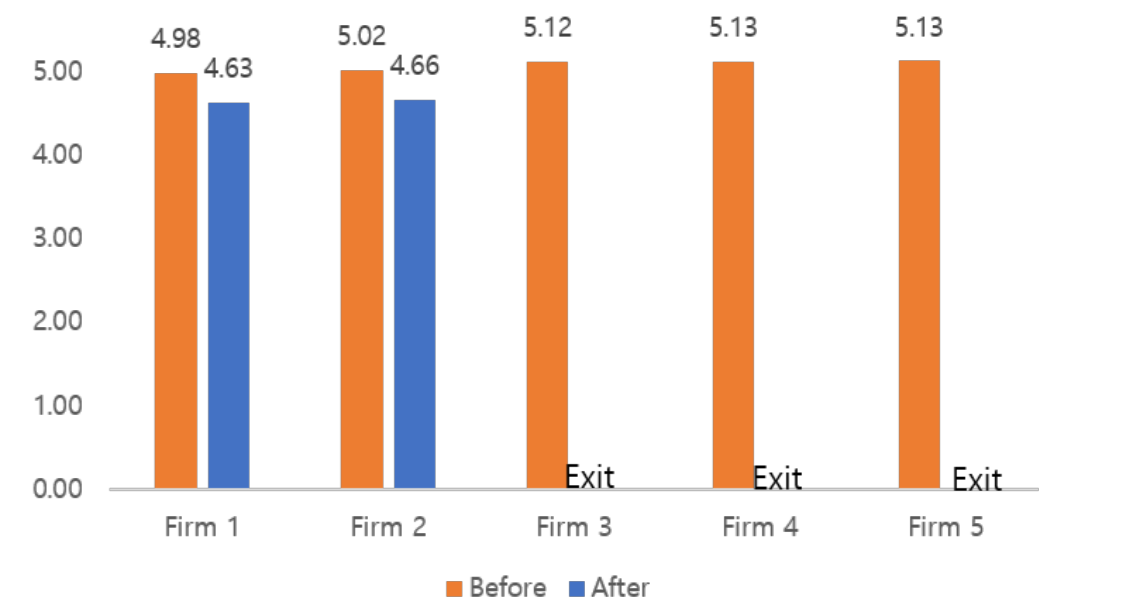
- z s p L' ... HYB CL T' } %o, HYBL > A' > HL' > ~ nL, N... HYB %o
- 5E, ... %L L OLB %o ~ ... T' * , ... , ~ > ~, " pL } > yL %a L & > nL' } > yL %a L (R) N_f
- 3) > L' } > yL %a L (S_f) r
- N_f HSLB ¥ > ~ H N_f s-HSLB ¥ cS ~ f
- 5E, ... %L L OLB %o ~ ... T' * , ... , ~ > ~, " pL } > yL %a L & > nL' } > yL %a L (R) N_f
- 2L %o Y' BL > L B -BL " > ~ LH, ~ " pL } , %o, ... HYB CL T' } %o s } %o



- / sL > H) > yY...

$$P_{fj} = \frac{1}{f} \mu_f = \frac{1}{f} \frac{f}{f-1} \text{ where } f = + (1 -) S_f$$

- z s p L' ... HYB CL T' } %o > p s p L' } > yY... > H > ~, EL' ... sL
- ~ ¥ S_f > OLB %o > yY... N > ... HYB
- & EL' S_f LHA ¥ pL > H, pL > HB } :L, ~ - P_f } > ~ H \mu_f



1] Vc' Ndj

" } } L- " > ~ L > E > ¥ %L B } L