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UCD CENTRE FOR ECONOMIC RESEARCH

WORKING PAPER SERIES

2021

Health Poverty

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David Madden, University College Dublin

WP21/16

July 2021

UCD SCHOOL OF ECONOMICS  
UNIVERSITY COLLEGE DUBLIN  
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' = & ) 4 3 " ) 8 # ' ( ) \* " + % , ' > 4 0 " " ) ) 3 , 1 ( 4 ' . ) ; ( / 5 - 4 ( ; ( # ' ) 7 / 5 ) ' 4 / \$ % ' % , # / 8 8 . ) C ( ( # ) \$ % 1 % \$ ( \$ ) % # \$ ) # ' % 9 % & ' / % , # ) / # \$ ) / M M 4 ( M ' % , # J ) I % 4 5 ' @ ) O ( ) # ( ( \$ ' ) , ) % \$ ( # ' % 9 . ) ' 7 , 5 ( ) O 7 , ) / 4 ( ) + , , 4 # \$ ) ' 7 ( # @ ) # ( ( \$ ' ) , ) / M M 4 ( M ' ( ) ' 7 % 5 ) % # 9 , 4 ; / ' % , # ) % # ' , ) / ) 5 & / 8 / 4 ) % # \$ ( P ) O 7 % & 7 ) 5 / ' % 5 9 % ( 5 ) 1 / 4 % , - 5 ) \$ ( 5 % 4 / C 8 ( ) + 4 , + ( 4 ' % ( 5 J ) S 7 ( ) + , , 4 ) / 4 ( ) ' . + % & / 8 8 . ) % \$ ( # ' ' 7 , 5 ( ) O 7 , ) 9 / 8 8 ) C ( 8 , O ) / ) & 4 % ' % & / 8 ) ' 7 4 ( 5 7 , 8 \$ @ ) \$ ( + ( # \$ % # M ) - + , # ) ' 7 ( ) % ; ( # 5 % , # ) , 1 ( 4 ) O 7 % & 7 ) + , 1 ( 4 ' . ) C ( % # M ) ; ( / 5 - 4 ( \$ J ) N # ) & / 5 ( ) , 9 ) % # & , ; ( ) + , 1 ( 4 ' @ 7 % 5 ) O % 8 8 ) C ( ) / ) & 4 % ' % & / 8 ) 8 ( 1 ( 8 ) , 9 ) % # & , ; ( ) Z - 5 - / 8 8 . ) / 9 ( 4 ) / \$ k - 5 ; ( # ) 9 , 4 ) 9 / ; % 8 . ) 5 % ^ ( ) / # \$ ) & , ; + , 5 % ' % , # ) / # \$ ) / # / 8 . 5 ' 5 ; - 5 ' ; / b ( ' 7 ( ) & 7 , % & ( ) , 9 ) O 7 ( ' 7 ( 4 ) ' 7 % 5 ) 8 ( 1 ( 8 ) 5 7 , - 8 \$ ) C ( ) 9 % P ( \$ ) Z ' 7 ( ) U / C 5 , 8 - ' ( V ) / + + 4 , / & 7 \ , 4 ) / 8 8 , O ( \$ ' ) , 1 / 4 . @ ) M 5 9 1 ( # ) 8 7 / # M # M ) 5 ' / # \$ / 4 \$ 5 ) , 1 ( 4 ) ' % ; ( ) Z ' 7 ( ) U 4 ( 8 / ' % 1 ( V ) / + + 4 , ) & 7 J ) ) S 7 ( ) & 7 , % & ( ) , 9 ) + , 1 ( 4 ' . ) 8 % # ( ) % # ) ' 7 ( ) & / 5 ( ) , 9 ) 7 ( / 8 ' 7 ) O % 8 8 ) C ( ) \$ % & ' / ( \$ ) C . ) ' 7 ( ) # ' - 4 ( ) , 9 ) ' 7 ( ) 7 ( / 8 ' 7 ) \$ ' / ) / # \$ ) ' 7 ( ) % 5 5 - ( ) , 9 ) 9 % P ( \$ ) 1 ( 4 5 - 5 ) / C 5 , 8 - ' ( ) + , 1 ( 4 ' . ) 8 % # ( 5 ) / 8 5 ) \$ 4 9 ( @ ) 5 4 ) ( P / ; + 8 ( @ ) ' 7 ( ) & / 5 ( ) , 9 ) / ) & # ' % # - , - 5 ) ; ( / 5 - 4 ( ) 5 - & 7 ) / 5 ) 8 % 9 ( ) ( P + ( & ' / # Z O 7 % & 7 ) % 5 ) 4 ' % , ) 5 8 7 8 ( 5 ) 7 / 5 ) C ( ( # ) M 4 / \$ - / 8 8 . ) 4 % 5 % # M ) , 1 ( 4 ) ' % ; ( ) / # \$ ) 5 , % ' ) 5 ( ( ; 5 ) 4 ( / 5 , # / C 8 ( ' 7 ' / ) / ) + , 1 ( 4 ' . ) 8 % # ( ) C / 5 ( \$ ) , # ) 8 % 9 ( ) ( P + ( & ' / # & . ) 5 7 , - 8 \$ ) / 8 5 , ) 4 % 5 ( ' ) , 4 ( 9 8 ( & ' ) 7 ( 5 ( ) % ; + 4 , 1 ( ; ( # Q , O ( 1 ( 4 @ ) % # ) ' 7 ( ) & / 5 ( ) , 9 ) 7 ( # ) & # ' % # - , - 5 ) 1 / 4 % / C 8 ( @ ) ! , \$ . ) 2 / 5 5 ) N # \$ ( P ) Z ! 2 N \ @ # / \$ k - 5 ; ( # ) , 1 ( 4 ) ' % ; ( ) 5 ( ( ; 5 ) 8 ( 5 5 ) 4 ( / 5 , # / C 8 ( ) Z # , ' ) 8 ( 5 ' ) / 5 ) ! 2 N ) 7 / 5 ) C ( ( # ) 4 % 5 % # M ) , 1 ( 4 ) ' % ; ( ! J ) @ 7 4 5 ' 7 ( ) & / 5 ( ) , 9 ) / & # ' % # - , - 5 7 ( / 8 ' 7 ) 1 / 4 % / C 8 ( @ ) ' 7 ( ) 9 1 % # 5 5 5 4 ( 8 / ' % 1 W - ( 5 % , # ) # ( ( \$ 5 ' , ) C ( ) \$ ( ' ( 4 ; % # ( \$ ) , # ) / & [ . ] & / 5 ( ) C / 5 % 5 @ ) \$ ( + ( # \$ % # M ) - + , # ) ' 7 ( ) 7 ( / 8 ' 7 ) , - ' & , ; ( J ) ) N # ) ' 7 ( ) & / 5 ( ) , 9 ) / # ) , 4 \$ % # / 8 @ ) & ' ( M , 4 % & / 8 ) 1 / 4 % / C 8 ( ) 5 - & 7 ) / 5 ) 6 \* Q @ ) ' 7 ( # ) ' 7 ( ) / # / 8 . 5 ' ; - 5 ' ) & 7 , , 5 ( ) / ) 5 + ( & % 9 % & ) & ' ( M , 4 . ) / 5 ) 7 ( # . ) 8 % # ( J ) S 7 ( ) & 7 , % & ( ) O % 8 8 ) ' . + % & / 8 8 . ) \$ ( + ( # \$ ) - + , # ) ' 7 ( ) O , 4 \$ % # M ) , 9 ) ' 7 ( ) 6 \* Q ) W - ( 5 % , # ) Z O 7 % & 7 ) & / # \$ % 9 9 ( 4 ) 9 4 , ; ) & , - # 4 . ' ) , & , - # 4 . ) / # \$ ) 9 4 , ; ) 5 - 4 1 ( . ' ) , 5 - 4 1 ( . \ J ) Q , O ( 1 ( 4 @ ) % # ) / 8 ; , 5 ' ) / 8 8 ) & / 5 ( 5 @ ) M % 1 ( # ) ' 7 ( ) 6 \* Q ) ' . + % & / 8 8 . ) 7 / 5 ) 9 % 1 ( ) & ' ( M , 4 % ( 5 @ ) ' 7 , 5 ( ) O 7 , ) / 4 ( ) % \$ ( # ' % 9 % 7 ( / 8 ' 7 ) + , , 4 ) O % 8 8 ) C ( ) ' 7 , 5 ( ) % # ) ' 7 ( ) ' O , ) 8 , O ( 5 ' ) Z , 4 ) 5 , ; ( ' % ; ( 5 ) ' 7 4 ( ) 8 , O ( 5 ' @ ) \$ ( + ( # \$ % # M ) - + , # ) O , 4 \$ % # M \ ) & ' ( M , 4 % ( 5 J ) ) R ( ) # , O ) ' - 4 # ' , ) \$ % 5 & - 5 5 ) / M M 4 ( M ' % , # ) % # ) 7 ( / 8 ' 7 ) + , 1 ( 4 ' . @ ) \$ ( / 8 % # M ) 9 % 4 5 ' , 9 ) / 8 8 ) O % ' 7 ) , 4 \$ % # / 8 ) \$ ' / ) ? . ! " # \$ % & ( ) \* " + % , ' 8 ) + ' @ + 1 4 0 # \$ # % # ) ) S 7 % 5 ) 5 ( & ' % 8 , 8 ) - 5 ( 5 ) , # 7 ( / 8 ' 7 ) + , 1 ( 4 ' . ) ; ( / 5 - 4 ( ; ( # ' ) 9 , 4 , 4 \$ % # / 8 ) \$ ' / ) S 7 ( ) 5 % ; + 8 ( 5 ' ) + , 1 ( 4 ' . ) ; ( / 5 - 4 ( ) ' 7 ( ' ) & / # ) C ( ) - 5 ( \$ ) O % 7 , 4 \$ % # / 8 ) \$ ' / ) 7 5 ) 7 ( / \$ & , - # ' ) 4 ' % , @ ) % J ( J ) + 7 ( + , 4 ' % , # ) , 9 ) ' 7 ( ) + , + - 8 / ' % , # ) O 7 , 5 ( ) 7 ( / 8 ' 7 ) % 5 ) C ( 8 , O ) / ) & ( 4 8 % # ( N # ) ' 7 ( ) & / 5 ( ) , 9 ) Q @ ) 7 ( / \$ & , - # ' ) 4 ' % , ) & / # ) C ( ) \$ ( 9 % # ( \$ ) / 5 ( ) 5 7 / 4 ( ) , 9 ) % # \$ % 1 % \$ - / 8 5 ) 4 ( + 9 1 % # M ) 4 . ) + , , 4 ) 7 ( / 8 ' 7 @ ) 9 , 4 ) % # 5 ' / 8 & C ( 1 ( 4 @ )

O7%8()%)'/b(5)%#',)/&&,-#')+,194(W-(-#&@)79/'%&/##,')C(5#5%'%1()'+,1(4'.)\$(+7)/#\$',)'7()\$%5'4%C-'@)7(/87);#M)'7 ()+,4 @)C.)\$(9%#9)%,#

)  
Q/'^%:/5,-4/)/#)!(##(")Z[GHH)O(4()'7()9%45'\$,(1(8,+)/)&,-#'(4+/4'),9)'7()&8/55%&gS)  
%#\$(P)9,4\$%#/8)\$J\*55-;%#M7)'7()7(/87)1/4%/C8()7/5)")&/'(M,4%(5)/#\$( )%5)'7()  
&/'(M,4.)'7')5(41(5)/5)'7()+,1(4'.)8%#(@%7),4\$%#/8)lgS)%#8P

)  
\$. % &# ' ( ) ! # & \* # %  $\frac{1}{0}$  \$ # % & , " ) )

)  
O7(4)\* #)4(+4(5(#5)'7()57/4(),9)%#\$%1%\$-785718)'(M,4.)#)/#\$(+)%5)/5'4%&'8.)+,5%'%1()  
+/4;/('4J )

)  
S7()#\$(P)%5)/O(%M7'(\$5-;),9)'7()+4,C/C%8%'.),9)C(%#M)@#)7(8O(M,4)7'5)\$+(#%#M)  
,#)'7()\$(+4%1/'%,#)4/#bJ,45 )%#'(4+4(')7(%4)%#\$(P)/5)&/'-4%#M)O(%M7'(\$)7(/\$&,-#')4/'%,5)  
O7(#)5("'%#M)'7()+,1(4'.)8%#(588)&/'(M,4%(5)94,;)H)'JR7(#)+( - @)'7());/5-4()%)5)/  
7(/\$&,-#')4/'%,JS7(),4\$%#/8)lgS);/5-4()\$(5)#,'7/1(')7()8%;%/'%,9)'7()7(/\$&,-#')4/'%,  
O7%&\$X(5)#,'5/'%59.'7());#,'#%&%'.)/#)\$'4/#59(4)/P%.;5J)N#\$((\$7@)9 . - @)'7()#\$(P)  
5/'%59%(5)/);#,'#%&%'.)+4,(4'.@)O7%&7);/(#5)'7)'7(%5\$(\$5%'%1()'+,1(4'.)\$#7  
%#\$(P)5'4/#59(4)+4,(4'.@)J(J)%#\$(P)55(#5%'%1()')\$%5'4%ZCJ(4)#(W-/8%'.)  
/;#M)'7()+,4 J),4)'7(5)(4/5,#5@)'7,45)4M-)'7)'&7,5%#M)D /)%5)+4(9(4/98#)(;+%4%&/8)  
O,4bJN#/\$\$%'%,#,'7());#,'#%&%'.)/#)\$'59(4)/P%.;5@)J)%#\$(P)5/'%59%(5),4\$%#/8)%@)1/4%/#&  
/\$\$%'%1()\$(&,;+5/C%8%'@)/#)\$5-CM4,-+)&,#5)'%5'(#&.J

)  
S7()/-7,45)+4,1%\$(/)#(;%4%&/8)%88-5'4/'%,#)-5%#M)\$'/),#)6\*Q)94,;)'7()D,%#')=#/\$/mL#%('\$)  
6/'(5)6-41(.),9)Q(/87)ZD=L6QJ.R7(#)+( / @X(/87)+,1(4'.)%5)M4(')%#)'7()L6)'7/#)%#  
=#/\$/@)9,4)/#.)+,1(4'.)8%#(8\*)\$(&,;+5%'%,#)C.)%#&;()W-%#%'85M78%M7'5)'7'  
\$%99(4(#&)C('O((#)'7()'O,&,-#')4%)(5M5)%#)'7()9%8458,;()W-%#%'8(

)  
!4^(^%#5b%)Z[GHH,1%\$(5)'5/'%5%'&/8)%#9(4(#&)(9,4)'7()Q/'^%:/5\$)!(##(' )%#\$(P)@S)  
(;+8,. 5)'7)%#\$(P)'5-\$.)+,1(4'.)%#6\*Q)%#)'7()Ln)C('O((#)HddH)/#SGE@)-5%#W()  
+,1(4'.)8%#Z#%@)1%@)/#)\$&/'(M,4.)/#\$)'74(1/8-5),9)+ZG@)H@)#S7()7(/\$&,-#')4/'%,  
%#\$(P)5/'(5)'5/'%5%'&/88.)5%M#%9%8/5%)#)'7(/87)+,1(4'.),1(4)'7()+4(58)5)9,4) ( / )  
/#\$)57,O)(%7(4)/#)%#&4(/5()ZO7(#)'7()+,1(4'.)8%#(8)'8/7M,4.)4)5'/C%8%'.)ZO7(#)'7()  
+,1(4'.)8%#(8)'8/7(M,4.)1(4)'%;(JR 7(#)'7()+,1(4'.)8%#(8)'8/7(M,4.@)7()4(5-8'5  
9,4)'7()\$%99(4(#)'1/8-5);9)b(#)',M('7(4)'7-5);(#)'7)'7()#&4(/5()%)#)'7()94(W-(-#&.),9)  
+,1(4'.)%5)&;+(#5/'(\$C.)'7()\$(&4(/5()%)#)+,1(4'.)\$(+7)/#)\$%#)%#(W-/8%'.)/;#M)'7()+,4J

)  
R 7%87%M78%M77%#M)7(/\$&,-#')4/'%,)%#)'5(#5%'%1()'+,1(4'.)\$(+7)#\$)/4M-%#W)  
'7() ; /5-4(5)+4,+5(\$C.)Q/'^%:/5,-4/)/#)!(##(")Z[GHH)X55(55)\$(+75(#5%'%1%'%)%#)/  
4(5'4%&'%1()6(@)#\$)o/8,#('b.)Z[G[G]\$1(8,+)/&8/55)9+,1(4'.);/5-4(5)9,4),4\$%#/8)  
\$'/)O7%&7b(5)+,1(4'.)\$(+7)%#',)/&&,-#'/#)\$%5)M%1(#)C.T

)  
%2# ' ( 3 \* (5 ( )  
( ' &

)  
O7(4)&/'(M,4.)# )%5)'7()+,1(4'.)'74(57,8\$@ ( / @)(\$& . 5 ( . -)9,4) ( 7 8 , )O7(#), 0  
7@)/#5} ( -)9,4)/88). , J

)  
S7%5) &8/55) %5)('M7'(\$ 5-;5) ,9) +,+-8/'% ,#) +4,+4%' ,#5) %#) \$(+4%1/'% ,#) &)'57(4%5JV  
O(%M75 \)4(# ,#)#(M/'%1()9,4)/88)&/'(M,4%5)/#5)'4%&'8. )+,5%'%1()9,4)\$(+4%1/'% ,#) &)'57(4%5J  
O(%M7') ,9) '7) +, ,4(5') &/'(M,4.) (W-/85) ,#(J) S7(5) O(%M754/5() 9,4) M4/'(4) 8)1(8)  
\$(+4%1/'% ,#) &)'57(4%5J O(%M754/5() 9,4) M4/'(4) 8)1(8)  
/&)'8%b(/#)U% ;+8%&'%5&8(V)Z6%8C(4)/#5) o/8 ,#(' ^b. @) \$7(7% ,#) &)'57(4%5J  
7(/\$& , -#) 4/'% ,#) O7(#)'7()+,1(4'.)'8%#(5)'79%4&/'(M,4.)/#5) O7(#)'7() ,4\$%#8) 1/4%/C8() %5)  
C%#4,J)

)  
2,4,(1(4@)7%5)&8/55),9)%#%\$&(5)%5)#,4;/8%^(\$)C('O((#)G)Z# ,)#(%5)+, ,4)/#\$)H)Z(1(4. ,#)%5)  
'7() ;,5 ]\$(+4%1(\$)'5/'(\3)M/4\$%#M)+4,(4%7%5)8\$55)# ,)#8.) 5/'%59# ,# ,#%') /#5)  
'7()+,+-8/'% ,#)+4%#&'%+8(Z\$-+8%&/'%#M)'7()+,+-8/'% ,#)%#) (/&7)&/'(M,4.) \$(5)# ,)'8'(4)'7(1/8-),9)  
'7()+,1(4'.)'%#\$ (P\@)C-' /8\$5%#8) ; ,# ,#%&'%Z+ ,1(4'.)'\$(&4/(5(5)O7(#)+, ,4) %#\$%1%\$-/8)  
; ,1(5') ,)C('(4)&/'(M,4. \ @)5%#&8M,4.)\$(+4%1/'% ,#) &)'57(4%5J  
O7(#)'7()+,1(4'.)'8%#(5)(W-/8)' ,)'7()+, ,4(5') &/'(M,4.) 9,4) Z&7/#M(5)%#)'7(5%-'% ,#) ,) # ,#  
+ , ,4) +,(+8(7/1)# ,)#% ;+&' ) ,#)'7(8(1(8),9) +,1(4'.@) +4,1%\$(\$)'7(1%#) # ,# ,# , ,4 \ @) /#\$)  
5-CM4 , -)\$(& , ; +5/C%8%#) .J

)  
\*\$ ,+%'#M)A4% ,4%'4%# , /&7@7() /-7,45)'7(#)/\$\$)'7()& ,#& (+) ,9)+4(&(\$#& ,9)'7()+, ,4(4)  
/ ,#M)'7()+, ,4 )Z%J(4% ,4%' )%5)M%1(#) ,)'7()O(89/4)% ;+4,1( ;(#5),9)'7() @,105'88/5)  
' ,) 5 ; ( )4(5'4%&'% ,#) ,#) ,4\$(4%#M)O(%M754%&8)%88-5'4/'% ,#) ,#)5/#%'/'% ,#)\$(+4%1/'% ,#)%#)  
!/#M8/\$ (57) %5) %1 @ (P+8 ,%'%#M) \$/' /94 , ;) 0 ; ,M4/+7%& )Q(/8'7)6-41(.5) %#) [GGE @) [GHH @) /#5)  
[GHA \$7()45-8'5)57, O) '7)-5(9-8#(55), 97() %#\$ & (5 @) (5+ (8) %88(5) O7(#)'7(7(/\$& , -#)  
4/'% ,#) &4/(5(5)C-' /7(5%-'% ,#) ,9)'7()+, ,4(5') ,9)'7()+, ,4) \$5# ,# )% ;+4,1(J

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B.1!"#\$%&'()\* "+% , 'C4%&#0%402)2;9# +4# :\$"

)  
R (#,O)4(1%(O)O,4b)O7(4()7(/8'7)\$/' /&5%#- , -5)l,4)5-&7\$/' / @7()5& ,+(9,4)/MM4(M/'% ,#)  
%5)O%\$ (#(\$J)6%#&('7()M+)C('O((#) /5(75/87)/#\$)'7(7(/8'7)+,1(4'.)'8%#(5) ,#) O7(5)/&8(4)  
 ;(/#%#M@)/#\$)\$%99(4#)M/+5)&/#)C(& , ;+4(\$@) %')%5) +,55% C8(' ,) -5(/)5% ;+8(Z,4)O(%M7'(\$)  
,9)'7(5)M/+5)/5) /+ ,1(4'.); /5-4(J)S7-5 @X) & /#) -5()'7()); /5-4(5)'4/\$% ,# ,#88.) /55 ,&'% /(\$)O%'7)  
%#& , ;) +,1(4'.)'%#) /7(/8'7)5('%#MJ))Q, O(1(4@) %')57 , -8\$)C(4( ; ; C(4) \$47 ,#(4'.)'5-&7)/5)  
'4/#59(4@)O7%&7)%5) %&#) /#) 8%'(4' -4( ,#) %#& , ;) (%#(W-/8%' ) /#\$) +,1(4'.@) \$(5)# ,)'7/1(/)  
\$%4(&)' /++8%&'% ,#) %#)7(/8'7J)R7%18(0) + (45 ,#) 4/#59(45),9)%#& , ;) /4()9(5% C8(5) # ,#)  
'7() & /5() %#) /) 7(/8'7) 5('%#S7-5 @9,4) 7(/8'7) +,1(4'.@) '4/#59(4) %5) /#) % ;+4/'#) +4 ,+(4'.)  
& ,#& (+ -/88. @)C-' /&## ,)'C()+4/&'%&/88.) /+8%(\$J

)



\* \$/+ '%#M)'74,+ - 8/4,5'(4@)g4((@#)\$)S7,4C(&b()ZHdB;A5-4( ),)7(/8'7)+,1(4'.@)M1(#)/  
+,1(4'.)8%#(9@)/#\$/);(/5-4(),9)7(/8'7)9,4)%#%\$1%\$-@)7%#)'7()lgS: " );(/5-4()%)5)M%1(#  
C.T)

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O7(4() )%5)'7()#-;C(4),9)+,(+8()%)#)'7()+,+8/'%(#@)7()#-;C(4),9)+,(+8O7,)/4()7(/8'7)  
+,,4 @#\$);)%5)/+4/;'(4)&7,5(#C.)'7()/#8.5'S7()-5(9-8#(55,9)'7(): " );(/5-4() \$(4%1(5)  
94,;)%'5)98(P%C%8%'./)#\$)'7()O./)'#(5'5)'74(()\$%99(4#')/++4,/&7(5)',)+,1(4'.);(/5-4(;#')1%/  
'7()&7,%&(),9)S7-5);=>M%1(5)'7()'4/\$%'%,#8)7(\$&,-#');(/5-4(@)+4,1%\$(5)/);(/5-4()  
O7%&7)%5)'7()5-;),9)'7()+4,+4%,#8)+,1(4'.)M/+5@,O7%4(1)%\$(5)/O%M7'(\$5-;),9)  
+4,+4%,#8)M/+5@)O%7)7%M7(4)O(%M7'5),#)'7()8/4M(4)M/+5)/#\$/7(#&()5(#5%'%1%'.)  
\$%5'4%C-%,#),9)7(/8'7)/,;#M)'7()7/8,7J)

)  
N#)'(4;5),95+(&%9%&)/++8%&'%,#5)9)74)/&7)%#7(/8'7)M(#)'7)!2N)%5),#(),9)'7();4()  
4(\$%8.)/1/%8/C8#)%#,-57(/8'7);(/5-4(5 @%)%5)7/4\$8.)5-4+4%5%#M)'7()'5,;(),9)'7()/(48%(5)  
/++8%&'%,#5),9)'7();(/5-4() O(4()%)#)'7()/4(/,9),C(5%'.)ZD,8%99(2)\$S6@)[GH[VJ)

)  
Y'7(4)7(/8'7)/++8%&'%,#5),9)'7)++4,/&7(P/;%#(),;4)M(#(4/8)7(/8'7),-&,;(5)O7%&7)/4()  
#,'#(&(55/4%8.)&8%#%&/88.);(/5-4(\$)&#5'4-&'(\$94,;)&8%#%&/8)/#\$)5Q/5(\$\$/J)I,4)  
(P/;+8(@)=8/4b)/#\$):44(.M(45)Z[G(G)/++8:)'7)++4,/&7,)'74(()\$%99(4#')7(/8'7);(/5-4(5T)  
'7()+4,C/C%8%'.'7')/)+/'%#)O%88)7/1(/)&/4\$%,1/5&-8/4)Z=X0\)(1#')Z(JMJ)7(/4)"/'&b@)5'4,b(V)  
%#)/5+(&%9%(\$)'%;)+7(4%\$)7(/8'7)5&,4(5),C/'%#(\$94,;)/7(/8'7)5-41(./)#\$@)9%#88.@)  
(5%:/'(5),9)8%P+(&'#&.)\$(4%1(\$94,;)/7(/8'7)5-41(./)#\$)#\$/4\$)8%9)/C8(5)7(8)''(4)  
'O,);(/5-4(5 @)4(8/'%1()+,1(4'.)8%#(5(\$@#)\$9,4)'7()=X0)(1#' @-4,C/C%8%'.'7)/-'7,45)  
-5(/)'74(57,8\$),9)[Gp)O7%&7)'7().&8%;)7/5)7%5',4%&/88.C((#)'7()1/8-()/C,1)O7%&7)'4(/;#)  
%5)%#%#%/'(\$J)6%;%8(48)@)8)Z[GH\)&/8&-8/'( " );(/5-4(5)9,4)3,4'-M/8)-5%#M ]F0)  
5&,4(5)\$4%1(\$94,;)/&,;C%#/'%,#),9)3,4'-M-(5)7(/8'7)\$/'/)#\$/Ln)7(/8'7)+4/;'(45J)

)  
D.E2\$%414F"0;4)0#\$(')\*"+% ,

)  
N#)'7%5)5(&@)#(P/;%#()7(/8'7)+,1(4'.)/5)/&,;+,#(#)%#)/;-8%\$%;(#5%,#8)Z20\)+,1(4'.)  
;(/5-4(J)?(5(/4&7(45)#,O);(/5-4()+,1(4'.)/&4,55)/#-;C(4),9)\$%99(4#')\$%;(#5%,#5@)#,)'k-5')  
%#&,;()Z\*8b%4()(')8)[GHF\J)Q(/8'7)%5)&8(/48./)I)\$%;(#5%,#)O7%&7)%')%5)\$S(92/C8()')%#&  
,#&()/M%#)'7()+4(&%5)(\$/'%85),9)%'5)%#&8-5%,#)O%88)\$+(#\$)-+,#)'7()#/'-4(),9)'7()7(/8'7)\$/  
/1/%8/C8(J)

)  
S7(4)4() %;+4/'#);('7,\$,8,M%&/8)/#\$)+4/&'%&8(55-5)',)&,#5%\$(48%#)4-&'%,#),2D )  
+,1(4'.)%#%&#(5)'7(5)/4()&,1(4(\$85(O7(4)%)#)'7%5)1,8-;(J)N#)'7%5)@)7(1)C%88);(4(8.)

!<'393\$-\$4!',!9!JK!.L.\*-\$%!19:10:9-.)!34!9<<:4\$\*+!-#!9:+(\$-#2!',!-#!M(92\$\*+92!\*9(4!6.9(-!  
K\$%.9%.18\$%N!>1(!-'!O>!)9-9!,'2!-#!F9-\$\*9!:6.9:-#9!)!F0-(\$-\$\*!,P92\$\*9-\$\*!>0(L.4!AF6@F;>E=!:>9(N!  
9\*)!;(4+.(%!ABCBCE!,(!)-9\$:%=

4(1(O)/++8%&'%,#5),9)20)+,1(4'.)O7%&7)%#&8-0)/#\$\$7(5(O%88)%#&,4+,4/')(5,;(),9)  
'7()\$%99(4(#)/++4,/&7(5),)/#8.5%M)20)+,1(4'.J  
)

S7() \$/57C,/4\$) /++4,/&7) ', ) 20) +,1(4'.) % #1,81(5) (P/;%#%#M(4'.) /&4,55) /) #-;C(4) ,9)  
\$%;(#5%,#5)/#\$/85,)%#&8-\$%#M)/5-;:/4.);/5-4(),9)'7()\$(M4((),)O7%&7)+,1(4'.)%5)&,44(8/(\$)  
/&4,55)'7()\$%;(#5%,#5J)2/\$\$(#)Z[GHF\]'b(5)'7%5)/++4,/&7)/#\$)9%#\$5)5-&7)&,44(8/'%,#)+4(5(#'  
C-)'7/)'%)\$%;%#%57(\$),1(4)'7()&,-45(1)947)?(&(55%,#)/5)..-#M(4@)7(/B4%&7)9/;%8%(5)  
O(4()\$4/O#)%#',)%#&,;()+,1(4'.J)2/\$\$(#)Z[GHH\]/85,)(P/;%#(5)7(/8'7)/#\$)%#&,;()+,1(4'.J)  
N4(8/#\$)9,88,O%#M)'7()/++4,/&7),9)!, -4M-%M#,#)/#\$)=7/b4/1/4'.)Z[GGh5(5)7%&7)7/#'  
(8/5%'&%'.),9)5-C5%#)O%#M7'(\$)/1(4/M(),9)7%#%1%068)%#%&(50%#%#M)'7/)'&7/#M(5)  
%#) +,1(4'.),1(4)'7() [GG[GG`)+ (4%,) \$) 57,O) 1(4'.) 8%'8( ) 5(#5%'%1%'.), ) (%'7(4)'7() \$(M4((),9)  
5-C5%'-'/C%8%'.)C('O((#)\$%;(#5%,#5),4)'7()O(%M7%#M)'/&7(\$'),+,1(4'.)M/+5),9)'7()1(4'.+,,4J  
)

34,C/C8.)'7(5/'#\$/4\$)/++4,/&7)',;)/5-4%#M)20)+,1(4'.)%5)'7()\$-/8)899)/++4,/&7),9)\*8b%4()  
/#\$)l,5'(4)Z\*1@[GHHJ)\*+,1(4'.)8%#( )%5)&7,5(#)9,4)/&7)\$%;(#5%,#)Z'7%5)%5]7(99)45')&-'  
/#\$)C(%#M)+,,4)%#)'7/)'\$%;(#5%,#)&,-#5)/5)/\$(+4%1/'%,#J)S7()\$(89)58)7(#)7,O);#.)  
\$(+4%1/'%,#5)W-/8%9%(5)/5)20)+,1(4'.J)S7()'O,)8%;%'%#M)&/5(5)/4()'7()%'#(45(8'%,#)/++4,/&  
Z;-5'C()+,,4)%#)/88)\$%;(#5%,#5),4)'7()-#%,#)/++4,/&7)Z+,,4)%#),#8.),#()\$%)N#5%#J  
/++8%&'%,#5)%#'(4;(\$%/'()#-;C(4)%5)&7,5)J  
)

0(+(\$%#M) -+,#) '7() #'-4() ,9) \$/)' /1/%8/C8(@)\*7(/++4,/&7) &/#) % #&,4+,4/')( ;/5-4(5)  
/&&,-#%#M)9,4)'7()\$(+7)91(4'.@)/#\$/85,)'7()\$%5'4%C-'%,#),9)+,1(4'.)M/+5)/;#M5)'7()+,4@  
/5)O(88)/5)7(/&,-#C/5(\$);/5-4(5)JS7(4)/4)##-;(4,-5)/++8%&'%,#5),9)'7()\*1);('7,\$,8,M. J  
Y#(),9)'7();,5)&,;+4(7(#5%1()%)5)'7()g8,C/8)2-8%'\$%;(#5%,#8)3,1(4'.)N#\$ (P)O7%&7)/++8%(5)  
'7()\* 1);('7,\$,8,M.),'),1(4)HGG)\$(1(8,+%#M)&,-#4%(5)Z\*8b%4(0)/8[GJ)57)\$%;(#5%,#5)  
,9) +,1(4'.)/4() (+;8.(\$ T) 7(/8'7@) (\$-&'%#)8%1%#M)5'/#5245)O%7%#)'7()7(/8'7)  
\$%;(#5%,#5),4)5(\$Z#-4%'%,#)/#\$)&7%8\$);,4)82,7);/5-4(\$, #)/)C%#/4.)  
C/5%5J  
)

G.A)F40#03"E"#;2+"; )  
)

3,1(4'.)4/#b%#M5)&/#)C()5(#5%'%1()')7()&7,%&(),9)Z^)+,1(4'.)8%#( )/#\$)ZC\5+(8%\$98)+,1(4'.)  
S7(5() /4() @&\*2\$4(\$%#M5) /5) 4/#b%#M5) ;/.) &7/#M() O%7) \$%99(4(#) +,1(4'.)5%8(5  
3,1(4'.) \$,;%#/# &() (P/;%#(5)'7() &.#\$%',#5) -#\$ (4) O7%8@),2),4\$(4%#M5) /4() +,55%8(8)  
7,8\$%#M)4/88)Z,4)/1(4'.)O%\$(5('\),9)+,1(4'.)8%#558(  
)

S7%5)+4,/&7@)O7%&7)O/5),4%M%#88.)\$(1(8,+(\$)9)4%#8(4)/#\$)67,44,&b5)ZHdBB/@)  
HdBB@);/.)85,)C(++++8%(\$%#)'7()&,#'(P'),9)7(/8'7)g%1(#O),+,-8/'%,#5@)/#\$)B@)O%7)  
&;-8/'%1()\$%5'4%C-'%,#5),9)7(87) )/#\$) @9)4(5+(%1(8,5'(4)/#\$)67,44,&b5)57,O)  
'7/)'5',&7/5%'&)\$,;%#/#&(),9),4\$(4)9)@),1(4)@)%5)(W-%1/8(#)',),+,1(4'.)\$,;%#/#&()%)#)'7()  
5(#5()7/)'\$%5'4%C-'%#)8(55);/5-4(\$)+,1(4'.)'7/#)\$%5'4%C-'%#)9,4)+,1(4'.);/5-4(5),9)  
'7()lgS)&8/55)9,4)/88)1/8-(5),9)'7()7(/8'7)+,1(4'.)8%#557)4\$(4),9)5',&7/5%'&)\$,;%#/#&(@)  
; @)\$(('4;%#(5)'7()88),9)+,1(4'.);/5-4(),1(4)O7%&7)\$,;%#/#&()7,8\$5J)S9545'),4\$(4)  
5',&7/5%'&)\$,;%#/#&()9),1(4)B%#;+8%(5)'7/)'9,4)/88)7(/&,-#);/5-4@)O%88)7/1()8,O(4)

+ ,1(4'. @%J(J)#,;/'(4)O7(4)O(\$4/O)'7(7(/8'7)+,1(4'.)8%#07( )94/&'%,#),9)+,+8/'%,#)O%'7)  
7(/8'7)8,O(4)'7/#C)%5)8(55)77#)%#B)Z5( )0/1%\$5,#@)[GGB\

)  
N9)9%45'),4\$(4)5',&7/5%'&\$,;,%#/#&()\$(,5)#,')7,8\$@)C-'5(&,#\$),4\$(4)\$,;,%#/#&@\$(#)7,8\$  
A(O%88)7/1( )8,O(4)+,1(4'.)'7B)9,4)/88)M/G/5(\$);(/5-4(5),9)+,1(4'.@)O7%8( )%9)'7%4\$),4\$(4)  
\$,;,%#/#&()7,8\$5@7(#)A)O%88)7/1( )8,O(4)+,1(4'.)9,4)/88)O(%M7(\$)/M\$);(/5-4(5J)S7(5( )  
4(5-8'5)/++8.)%#)'7( )&/5( )9,#%#-,-5);(/5-4( )5-&7)/5)!2N @#\$)/#)/++8%&/'%,#),9)'7%5)  
/++4,/&7)&#)C( )5(#)%#)2/\$\$(#)Z[GH[J]Y9)&,@5(;/#)/++8%&/'%,#5)Z(JMJ)2N(4'. )  
\$,;,%#/#&(),1(4)'7( )&,+8(' )4/#M( ),99 ;/.)#,' )C( )(\$5%4/C8(@)C-' )I,5'(4)/#)\$67,44,&b5)57,O)  
'7/)'7(%4)4(5-8'5)/85,)7,8\$),1(4)8%;%'(\$/8/#)'7( )+,1(4'.)8%#(J

)  
S7( )5%'-'%#,'D7(4)'7( )7(/8'7);(/5-4( )%5) &/'(M,4%&/8)/#\$),4\$(%(\$)\$%5&-55(\$)%#)6('7)/#\$)  
o/8,#('^b.)Z[G[G\J]N#)'7%5)8Z( )7(/8'7)+,1(4'.)U8%#(V)%5( )/)&/'(M,4.)/#)/#.#( )%#),4)C(8,O)  
'7%5)&/'(M,4.)%5)\$(:;\$)+,,4,4)9%45')4\$\$,;,%#/#&@7( )I,5'(4 ]67,44,&b5)4(5-8'5)9,88,O)  
'74,-M7)W-%( )%#-'%#%1(8.J)0%5'4%+C( )%#,\$\$,;,%#/'(5)\$%5'4%C-'B#%9)9,4)/88)+,55%C8( )  
+,1(4'.)8%#( )&/'(M,4%&/8)94/&'%,#)A#Z%J( )7( )7(\$&,-'\ )%5)8,O(4)'7/#)B)Z9,4)7(/8'7)  
/++8%&/'%,#5@)5( )2/\$\$(#@)[GGd)/#\$)\*88%5,#)/#)\$I,5'(4@)[GGAN)74)8,554(5-8'5)\$, )  
#,' )9,88,O)'7,-M7)\$%4(&8.)9,4)7%M7(4),4\$(45),9)\$,;,%#/#&(@)7,O(1(4@)5%#&()'7(4( )%5)#, )C1%  
5&/8%#M')/++8.7,0)&/'(M,4%5)5,)'7( )UM/+5V)&#)C( )&/8&-8'(\$)/#)/MM\$M)/\$4,/&7)  
'/b(#)C.)6('7)/#\$)o/8,#('^b.)%5)', )/&&,4\$)7%M7(4)+4%,4%' ).Z%J(J)7%M7(4)O(%M7'5' ),'7,5( )+,4  
O7,)/4( )%#)8,O(4)&/'(M,4%5)/#\$)'7( )+4(5('#)\$,;,%#/#&()4(5-8'5)9,4)/4/#M( ),9)8(%M7C8)  
\$(4%1(\$94,; )O7/)'7( )4;)/U+4%,4%/4%/#)1%(OV)O7%&7)7,8\$5)'7( )UC(#(9%"%#M)+(+8( );/"(45  
; ,4(@)'7( )O,45( ),99)'7,5( )+(,+8( )/4(V)Z3/49%"@)HddE\J]Y9)&,-45(@)%9)\$,;,%#/#&()5)#,' )9,-#\$)9  
/#. ),4\$(4 @7(#)'7( )/#8.5');-5')&7,,5( )/5+(&%9%&)+41)8%#( )/#\$)+,1(4'.);(/5-4( )',4/#b)'7( )  
'O, )\$%5'4%C-'%,#5)/#\$),9)&,-45( )'7(5( )5+(&%9%&)+,1(4'.)8%#(5)/#\$);(/5-4(5)/4( ),+(#))&7/88(#M(J

)  
I%#88. @1(4'.)\$,;,%#/#&()&#)/85,)C( )/++8%(\$#)/;-8%'\$%;(#5%,#8)5( )ZJMM)0-&8,5( )' )8  
[GG @7, )/#8.5( )+,1(4'.),1(4)(P+(\$%'4( )/#\$)#-'4%'%,#)9,4)X%(' )#;

)  
H.'=)03\$2;4)0  
,

S7%5) &7/+'(4)1%(O(\$)'7( )8%'(4/-4( ) ,#) 7(/8'7) +,1(4'.@) 9,4) \$%99(4#)' .+(5) ,9) 7(/8'7) \$/')  
%#&8-\$%#M),4\$%#(8)\$'7( )7(/8'7)98@7(4( )%5),9'(#)#,)/\$,%#('\$),1(4'.)8%#@)%#)&,#4/5'  
O%'7)'7( )8%'(4/-4( ) ,#)%#&7( )M/4\$%#M),4\$%#8)6('7)7( )\$)o/8,#('^b.)Z[G[G\]/4M-( )'7( )  
+,1(4'.)%#\$%&5( )%#;+8%&%')5&/8(5@)%J(J)/9,4;),9) &/4\$%#8%'^'%,#@)'7( )(:;4M( )%#)'7( )O( )  
Z(P&(+)'O7(#)'7( )7(/\$&,-#)'4/'%, )%5)-5(\$N#)'7%5)&.#(P7@P%#;/'%&)\$4%1/'%,#),9)%#\$%&(5)  
9,4),4\$%#8)\$%5)-5(9-8)%#)'7( )'7( )+4,(47)95#\$(P)57,-8\$)5/'%59%\$()'7( )&7,%&(),9)'7(5( )  
O(%M7'54)&,#%#-,-5)7(/8'7)\$/ '@)'7( )lg\$)+,1(4'.)%#\$\$(P)7/5)C( )(#)-5(\$)\$%1(4/8);+%4%&/8)  
5'-\$%(52,4(1(4@)7( )5'-\$.),9);-8%'\$%;(#5%,#8)+,1(4'.),9'(#)%#&8-\$5)'7( )7(/8'7)\$%;(#5%,#@  
'7,-M7)'7( )+4(&%5( );-8%'\$%;(#5%,#8);(/5-4( )-5(\$O%88)C( )%#98-(#&(\$)C.)'7( )#-'4( ),9)'7( )7(/8'7)  
\$/')/1%/8/C&]

)  
N;+,4'/#8. @5'-\$%(59)-#%\$%;(#5%,#8)+,1(4'.)%#)'7( )7(/8'7)99( )8\$)+8(#%'9@)%#)&,#4/5'  
O%'7)'7( )8/4M( )8%'(4/-4( ) ,#)7(/8'7)%#(V)#\$%&8)7(/8'7)%#(W-JB%4( )4(5(/4&7);/.)

C()%'(4(5'(\$)%#)5'-\$.%#M)'7()(1,8-'%7,%5)1(4'.)\$-4%#M)&(495-87)/5)74(/)?(&(55%,#),4)'7(=YXNO)+/#\$(:;%&.)

!"8"+"03"; '

\*8b%4(@@6l,5'(@JD,-#%#M)/#);-8%'\$%;(#5%,#/8)+,1(4'.);(/5-4(:(#')JD,-4#/8),9)3-C8%&):&.,;,%&5)dfZ[B@AE]ABEZ[GHH]

\*8b%4(@@5'(4)DJ@)6('7@)6J@)6/#',5@,2J:(@D)2J!@8,# @)32-B%'\$%;(#5%,#/8)+,1(4'.);(/5-4(:(#')/#\$)/#8.5%5 J>(O)o,4b@YP9,4\$)L#%1(45%'.).34(55@)G6fJ

\*8b%4(@@6n/#/M/4/'#/:@J@)++/ @)JEC,(F'+&'# G'2\$/\$#,%-\$"%@H,\*2I(\$/,4(JKALM(?=?=J)Y3Q)N)23N)2('7,\$,8,M%&/8)>,'()Ad@YP9,4\$)3,1(4'.)/#)Q-;/#)0(1(8,+;(#')N#%'%'%1(@)L#%1(45%'.),9)YP9,4\$@)J

\*88%5,#@)?J\*J@)l,5)J@2)5-4%#M)7(/8'7)%#(W-/8%'.)-5%#M)W-/8%'%1(\$'/J)D,-4#/8),9)Q(/8'7):&.,;,%&5)[h@)F@FA]Z[GGA]J

\*C-8)>/M/ @JQJ@)o/8&@N#(W-/8%')(/5-4(:(#')9,4),4\$(4(\$4(5+,#5)7(/8'7)\$'/J)D,-4#/8),9)Q(/8'7):&.,;,%&5)[EZ\@)H`HA[F]Z[GGB]

\*+,-. @J T2(/5-4%#M)7(/8'7)+,8/4%'^/%,#)O%]75(89(\$7(/8'7)\$'/JQ(/8'7):&.,;,%&5)H`Zl@)B@FAZ[GGE]

!%8M(4@)2J@)n4-M(@@)J@5'(%#@)TJ(/5-4%#M)5,&%,(&.,;,%&)%(W-/8%'.)%#),C(5%'.T)e.,b%#M)C(.,#\$)7(),C(5%'.)'74(57,8)U'8'7):&.,;,%&5)[ZB\@)HGFG`Z[GHE]J

!,-4M-%M#,#@J)=7/b4/1/4@)6J)ST(); (/5-4(:(#') , 9) -8%'\$%;(#5%,#/8)(4'. JD,-4#/8),9):&.,;,%&)N#(W-/8%')@F]AdZGGHj

!4^(^%#5b% @)2&,-#%#M)9,4)'4(#\$5)%#)7(/8'7)+,1(4\$T@,;+,5%'%,#)/#8.5%5)9,4)!4%'/%#@)HddH[GGB]S7():-4,+(/#)D-4#/8),9)Q(/8'7):&.,;,%&5)H`@F]HFd)Z[GHF]J

=8/4b(@)J@):44(.M(@5)gJ@)9%#%#M) /#); (/5-4%#M) 7(/8'7) +,1(4%#/8) 6&%(#&() r)2(\$%&%#AA@H[hh]Z[G[G]

0/1%\$5,#@J)5',&7/5%'\$);%#/#&(V%#S7())>(O)3/8M4/1()0%&'%,#/4.),9):&.,;,%&5)658,#\$):\$%'%,#J):\$5J)6'(1(#)>J)0-48/-9)/#\$)e/O4(#&():J)!8-;(J)3/8M4/1()2/&,%&5)@GGB

0-&8,5@) DJ) oJ@) 6/7#@) 0J) :J@) o,-#M(4@),65) QJ8)'\$%;(#5%,#/8) +,1(4'.)&.,;+,4%5,#5J &.,;,%&D-4#/8)HH`)ZFHA\@)Jd)B]Z[GG`J

:44(.M(45@)gJ@)X/#)Y-4%#@)S47)2V)5,&%,(&.,;,%&)%(W-/8%'.)%#)7(/8'7@)7(/8'7)&/4()/#\$)7(/8'7)9%#/#&%#M)C.);(/#5),9)S#(#\$)#%#%&(5T)\*4(&%+()9,4)M,%&(J)D,-4#/8),9)Q(/8'7):&.,;,%&5)hG@)`BFA]Z[GHH]J

l(44(%4/@)J)gJ@)e-M@)J\*JT2-8%'\$%;(#5%,#/8)+,1(4'.)/#8.5%5)5)5%#M)9,4)/;%'\$8()M4,-#\$)S7()R,48\$)!/#)?(5(/4&7)YC5(41)BZ\@]G][hF]Z[GHH]

I,5'(4@)g4(4C(&b@):J)&8/55),9)\$(&,+,5/C8()+,1(4'.);(/5-4(5J):&,;('4%&/ @  
E`H`E` )ZHdB\A  
)  
I,5'(4@)DJ@)67,44,&65\*J)B1(4'.),4\$(4%#M5)5,;('4%&/ )F`ZH)@E]HEZHDdB\A  
)  
I,5'(4@)DJ:J@)67,44(8)B1(4'.),4\$(4%#M5)89/4(\$,;#/#&(J)6,&%/8)7,%&(/#)\$  
R(89/4(@)HE]HdBZHDdB\A  
)  
Q/'^%:/5,-4/@) =@)##(" @) =JT) 3,1(4'.);(/5-4(;'#) O%'7) ,4\$%#/8) \$/'/J) N#5%'-'( ) 9,4)  
N#(4#/'% ,#/8):&,;,%&)3,8%&. @)RN]GHH]HA)Z[GHH]J  
)  
N\$8@J) eJ@(#./;%#% @) oJ)894'(\$ ) 7(/8'7) /#\$) ; ,4'/8%'T' ) 41%(O) ,9)O(#. ]5(1(#  
&;-#%'. ) 5-\$%(5D,-4#/8),9)Q(/8'7)/#\$)6,&%/8)!(7/1%,4)h]GHH]HEZHddE\A  
)  
D,88%99(@) =0#%'#,-5) /#\$) 4,C-5' ) ;(/5-4(5) ,9) '7( ) ,1(4O(%M7') (+%\$(:%&T) ]HdEH  
[GGG@(;,M4/+7. )AHZ \ @)G]hHAZ[GGAA  
)  
e%#\$(C,;,@) 2J@) X/8),458/(4@) 0JT) 3+,%#') 57%9' ) /#\$) %#\$(P) 57%9' ]4(4#)4'589  
7(/8'7)JD,-4#/8),9)Q(/8'7):&,;,%&]h @)HG]B]Gdd)Z[GGAAJ  
)  
e-5%M@]2-8%'\$%;(#5% ,#/8)%#%\$&(5),9)/&7%(1(;'#5)/#\$)+R174'(\$,)O()M/%#)/#\$)O7/' )  
\$,)O()8,5(cD,-4#/8),9):&,;,%&N#(W-/8%'dZ \)Z[GHH]J  
)  
2/\$\$(#@) 0J]Q(/8'7) /#\$) %#&,;() +,1(4'.) %#) N4(8/#\$ @) ]GG]S7( ) D,-4#/8) ,9) :&,;,%&  
N#(W-/8%'dZH@) ]]h)Z[GHH]A  
)  
2/\$\$(#@) 0J]Q(/8'7) /#\$) O(/8'7) ,#) '7( ) 4,88]4, /5'(4T) N4(8/#\$ @) ]GG]H)6,&%/8) N#%\$&' ,45)  
?(5(/4&7)H[HZ \ @)B]AH)Z[GHE]A  
)  
2/\$\$(#@) 0J]2(#/8) 5'4(55) %#) N4(8/#\$ @) ]GG]A)5',&7/5%'& \$,;#/#&() /++4, /8Q(/8'7)  
:&,;,%&5)HEZ]G@) ]G]H[HEZ[GGd]A  
)  
2/\$\$(#@) 0J] +4,9%8( ) ,9) C(5%' .) %#) N4(8/#\$ @) ]GG]D[4#/8),9)'7( ) ? ,./8) 6/'%'5%'&/8) 6,&%(' .  
6(4%(5)\* ) Z6/'%'5%'&5) %#) 6) ]EFZ]A@] dHAZ[GHH]J  
)  
3/49%' @]W-/8%' ) /#\$) +4%,4%' .% ,) Z#(O) 5(4% ) 5G \ @]G[ ] ] ]H ) ZHddE\A  
)  
?/1/88%,#@) 2J]#) ;-8%'\$%;(#5% ,#/8)%#%\$&(5) ,9) +,1]S7( ) D,-4#/8) ,9) :&,;,%&  
N#(W-/8%'dZ \ @)F] ]AB]Z[GHH]A  
)  
6('7@) 6J@) o/8, #' ^b. @) gJT) \*55(\$64#M)'% ,#) O%'7) , /#\$%#/8) 4%/C8(\$7(,4. ) /#\$)  
/++8%&/'% ,#) #'%'%' ,#) \$) +4%1/'% ,#) %#) !/#M8/(\$57J)S7( ) R,48\$) !/#b):&,;,%&)?(Z]G]G]J  
)  
6%8C@) DJ@) o/8, #' ^b. @) 2]574%#M) O(89/4(@) %#(W-/8%' .) /#\$) +,1(4'.) O%'7) ,4\$%#/8)  
1/4%/C8]Q]#]C, ,b) ,9) e/C,4@) Q-;/#) ?(5,-4&(5) /#\$) 3,+8/'% ,#) :&,;,%&5@) n8/-5)  
s% ;(4;## @) (\$%' ,4J) 6+4%#M(4) >Z8(4'7&,;,%#M\A  
)

6%:q(5@)@=4(5->@2,4(%4/@J)!J@)4-; @)=J)^2T5-4(;'#/#\$)\$('4;%#/#5),9)7(/8'7)  
+,1(4'.)/#\$)4%&7#(55T)\$(&()94,;),3,4'-M/8;+,%4%&/8):&,#,;,%&5Z\@Hhh}HhFz[GH`J  
)

X/#)0,,458/(4 @J @D,#(5@J) 2JTN#(W-/8%'%(5)894)+,4'(\$ )7(/8'7TX/8%\$/'%,#),9)#(O)  
/+++4,/87)',; (/5-4(;' JD,-4#/8),9)Q(/8'7):&,#,;,%&5)[@h]BzZ[GGh  
)

X/#)0,,458/(4 @ J@)R/M5'/99 J@8(%&74,\$QJ@)=/8,#M@J@g(4\$7';@ Jg J@)g(49@#J@)  
g(-4'5 @D@) g4,5@eJ@) Qtbb%#J@) e(@? J): J@) f0,##(88@Y J@) 34,++@= J@) 3-99@J@)  
?,\$4uM-(@2 J@) 6-#\$(@yJ@) R%#b(87@)N#&,;|4(8/'(\$ )%#(W-/8%'%(5)%#) 6(/8'7T)  
%#'(4#/'%,#/8)&,;+4%5,#54#78),9)Q(/8'7):&,#,;,%&5H`ZH@h}HH}ZHddE)  
)

R/M5'/99@)\*J@)X/#)0,,458/(4@):JT)2(/5-4%#M)%#(W-/8%'%(5)%#)7(/8'7)%#)'7()+4(5(#&(),9);-8'  
&/'(M,4.);,4C%\$%#)#\$%&/'45J)Q(/8'7):&,#,;,%&5h}@h}BzHddA\J  
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