

H-RXUQDO RI 7D[ 5HVHDUFK

YRO QR SS

7D[ 2IILFHU WKH H[HUFLVH  
DUWLILFLDO LQWHOOLJHQFH

'XQFDQ %HQWOH\

\$EVWUDFW

7KLV DUWLFOH H[DPLQHV WKH SULQFLSOHV XQGHUWD[DWLRQ ODZ LQ WKH FRQW  
SURSRVHV D IUDPHZRUN IRU WKH H[HUFLVH RI GLVFUHWLRQ E\ WKH \$XVWUDOLD  
H[SHUW V\VWHPV DQG HPHUJLQJ VXSHUYLVHG PDFKLQH OHDUQLQJ DQG GHHS  
IUDPHZRUN LV RI ZLGHU UHOHYDQFH WR SXEOLF VHFWRU GHOHJDWHG GHFLVLRQ  
,W LGHQWLILHV WKH FDSDELOLWLHV WKH \$72 UHTXLUHV WR LPSOHPHQW WKLV IU

.H\ZRUG\ DGPLQLVWUDWLRQ GLVFUHWLRQ GHFLVLRQ PDNLQJ SXEOLF WUXVW

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3URIHVVRU )HGHUDWLRQ 8QLYHUVLW\ \$XVWUDOLD \$GMXQFW 3URIHV

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H-RXUQDO RI 7D[ 5HVHDUFK

7D[ 2IILFHU

WKH H[HUFLVH RI GLVFUHWLRQ DQG

\$V GLJLWDO JRYHUQPHQW DQG WD[ GPLQLVWUDWLRQ H[:  
RI LQWHUDFWLRQ ZLWK FLWL]HQV DFURVV SODWIRUPV D  
PDNLQJ DQG WKH H[HUFLVH RI GLVFUHWLRQ ZLOO UHPD  
\*DYDJKDQ HW DO \$XVWUDOLDQ WD[ GPLQLVWUDW  
WLPHV RYHU WKH \HDUV GXULQJ LWV GHYHORSPHQW 2QH  
WKH LQWURGXFWLRQ LQ RI WKH ELQGDQDWLRQ XOLQ  
\$GPLQLVWUDW & \$E\ FRQMXQFWLRQ ZLWK WKH LQWURG  
7KH \$72 KDG WR EXLOG SXEOLF WUXVW LQ WKH QHZ V\V  
WUDQVIRUPLQJ LWV RZQ FDSDELOLWLHV

7KH FKDOOHQJH LV VHW RXW LQ WKH MRLQW

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7D[ 2IILFHU

WKH H[HUFLVH RI GLVFUHWLRQ DQG

OHJDO WKHRULHV IURP ZKLFK WKH FXUUHQW ODZ LV GH  
DSSURDFKHV ZLOO DOORZ OHJDO UHDVRQLQJ DQG MXGLF  
FRQVLVWHQW DV GLJLWDO WHFKQRORJLHV HPHUJH ,Q G  
PRYLFQJ WKH YLHZ RI WKH H[HUFLVH RI GLVFUHWLRQ DV R  
RQH WKDW UHIOHFWV LWV UHDOLW\ DV D SURFHVV  
,Q YLHZ RI WKH FOHDU GLUHFWRQ RI GLJLWDO JRYHUQP



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7D[ 2IILFHU

WKH H[HUFLVH RI GLVFUHWLRQ DQG

7KRVH SULQFLSOHV VHW RXW LQ 3DUW RI WKH \$5& 5HSR  
WKDW IRUPV SDUW RI RU DIIHFVV GHFLVLRQV UHTXLUL  
VXPPDULVHG DV IROORZV \$5& DQG DSSO\ HTXDOO\

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7D[ 2IILFHU

WKH H[HUFLVH RI GLVFUHWLRQ DQG

&RJOLDQHVH DQG /HKU S VXJJHVW WKDW WKHU  
PDFKLQH OHDUQLQJ RI PRVW FRQFHUQ LQ FRQVLGHULQJ  
OHDUQLQJ\ V VHOI OHDUQLQJ SURSHUW\ DV µWKH UHVXOWV  
VSHFLI\ LQJ LQ DGYDQFH KRZ HDFK YDULDEOH LV WR EH  
VHFRQG LV LWV µEODFN ER[\ QDWXUH DV µUHVXOWV R  
LQWXWLWLYHO\ H[SODLQDEOH DQG FDQQRW VXSSRUW FDXV  
WKH UHDVRQV WUDGLWLRQDOO\ RIIHUHG WR MXVWLI\ JRY  
DQG FRPSOH[LW\ RI PDFKLQH OHDUQLQJ WKDW VXSSRUWV  
UHVXOWV WKDW FDQ VKRUWHQ RU SRWHQWLDOO\ E\SDVV  
&RJOLDQHVH /HKU S

+RZHYZHUV DV LPSOLFLWO\ LGHQWLILHG LQ WKH 6HFWRQ  
GHVLJQHG GHYHORSHG DQG LPSOHPHQWHG E\ KXPDV  
&RXUW RI \$XVWUDOLD FRQVLGHUHG LVVXHV ZLWK UHODW

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7D[ 2IILFHU

WKH H[HUFLVH RI GLVFUHWLRQ DQG

ORVKLQVN\ DQG 'HUULQJWRQ -- LQ D P6DHNPBXQILWX VG M F L V L R  
OLQLVWHU IRU ,PPLJUDWLRQWDKODGV OMXIOHW IDFXWOKRXLVLDY@ G\$IRDILL  
UHDFKHG D FRQFOXVLRQ RQ WKH UHPLVVLRQ RI WKH JHQ  
GHFLVLRQ ZDV PDGH 7KH UHTXLUHPHQWV IRU WKH H[H  
GHFLVLRQ ZHUh PHW RQO\ VXEVHTXHQWO\ 7KHLU +RQRXU

,Q RUGHU IRU WKHUh WR EH D GHFLVLDQWLRRQHPLW  
\$GPLQLVWUDWL&RMQK \$@ WZH FRQVLGHU WKDW WKHUh  
PHQWDO SURFHVV RI UHDFKLQJ D FRQFOXVLRQ DQG  
FRQFOXVLRQ ,Q WKH SUHVHQW FDVH RQ WKH EDVH  
MXGJH ZKLFK DUH QRW FKDOOHQJHG RQ DSSHDO V  
UHDFKLQJ D FRQFOXVLRQ

\$ IXUWKHU IDFWRU RQ ZKLFK WKH PDMRULW\ GLIIHUHG IU



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WKH H[HUFLVH RI GLVFUHWLRQ DQG

\$OEX DQG )O\YHUERP QRWH WKH OLPLWHG HYLGHQW  
RSHQQHVV LQ WKHPVHOYHV DV D GULYHU RI SXEOLF WUXJ  
GULYHQ E\ UHFSLHQW SHUFHSWLRQ RI ZKDW DQG ZKHQ  
SHUFHSWLRQ RI LWV FODULW\ DFFXUDF\ DQG UHOHYDQF  
6FKQDFNHQEHUD 7RPOLQVRQ DQG WKHLU H[SHULH  
\$GPLQLVWUDWLYH ODZ SULQFLSOHV PXVW WKHUHIRUH H  
H[SHULHQFH LI WKH\ DUH WR PDLQWDLQ WKHLU UHOHYDQF

\$ SUDFWLFDO GLOHPPD WKHUHIRUH LV ZKHWKHU WKH S  
H[HUFLVH RI GLVFUHWLRQ FDQ LQFOXGH D FRPSRQHQW RI  
WKH PDMRULW\ QRLQW D\KLPLQKQRWHLQ\ WLKQV ZDV DQ LVVXH 7  
SDUDV FR\$60XQHGWW D\WLYW\ KIHFLVLRQV -XGLF  
&WK \$\$7 \$FFWW D,Q\W HUSUH\& D\WLRSQ R\$YFLWGH WKDW WKH  
GHOHJDWLRQ LV WR D VSHFLILHG SHUVRQ RU SHUVRQ KRC  
RI D VSHFLILHG RIILFH RU SRVLWLRQ DQG WKH FDVH OD  
JXLGDQFH DV WR WKH XVH RI DXWRPDWHG GHFLVLRQ  
UHFRPPHQGHG WKDW WKH XVH RI DQ H[SHUW V\VWHP VKRQ

7KLV ZLOO EHFRPH VHPDQWLF DV \$, EHFRPHV XELTXLWRX  
GLVFXVVHG DQG LQFOXGHG LQ WKH UHFRPPHQGDWLRQV  
FRQVWLWXWHV D GHFLVLRQ DQG KRZ LV LW H[HUFLVHG Z

/ \$: ,1 &217(;7

&RSLQJ ZLWK FKDQJH

\$QDQQ\ DQG &UDZIRUG LGHQWL\ WKH GLIIHUHQW W  
SURYLGH XVHIXO GHILQLWLRQ WR ERWK OHJDO GHFLVLRQ  
GHFLVLRQ PDNLQJ 3DUWLFXODUO\ LPSRUWDQW WR WUD  
UHTXLUHV WKH H[HUFLVH RI GLVFUHWLRQ LV UD\!-

H-RXUQDO RI 7D[ 5HVHDUFK

7D[ 2IILFHU

WKH H[HUFLVH RI GLVFUHWLRQ DQG

7KH SRLQWV DW LVVXH LQ WKLV DUWLFOH DUH WKH QDWX  
RI D GHFLVLRQ DQG WKH H[HUFLVH RI D GLVFUHWLRQ 7K  
WKH DSSOLFDWLRQ RI HOHPHQWV RI OHJDO WKHRU\ WR K  
GHFLVLRQ DQG GHFLVLRQ PDNHU DV D SURFHVV

7KH DSSURDFK IURP WKH DQDO\VLV WKXV IDU VXJJHVWV

H-RXUQDO RI 7D[ 5HVHDUFK

7D[ 2IILFHU

WKH H[HUFLVH RI GLVFUHWLRQ DQG

RUGHULQJ RI WKHLU DIIDLUV 7KLV DSSURDFK LV FRG  
GPLQLVWUDWLYH ODZ GHFLVLRQ PDNLQJ HPEHGGLQJ \$,  
/RWWDU\ H L3ORVWPRGHUQ &RQGLWLRQ

H-RXUQDO RI 7D[ 5HVHDUFK

7D[ 2IILFHU

WKH H[HUFLVH RI GLVFUHWLRQ DQG

'HFLVLRQV DV SURFHVV ± FKDQJLQJ KRZ DGPLQLVWUDWLYH OI



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WKH H[HUFLVH RI GLVFUHWLRQ DQG

GHHPHG YDOLG ZLWKRXW WU\LQJ WR UHFRQVWUXFW HYH  
LV QRZ EH\RQG VHJPHQWDWLRQ DW WKDW OHYHO RI GHW  
UHYHUW WR D OLWHUDO SRVLWLYLVWLF YLHZ RI WKH C  
UHYROXWLRQ

7R WDNH DQ H[DPSOH WKH YDOXDWLWLRQ RI WUDGLQJ V  
PHDVXUHPHQW HDFK LQFRPH \HQBZRXPQHGHDU \$WVWVVRQHQWRIS  
&WK ,Q DQ DOXPLQLXP VPHOWHU SURFHVV QR MXGJ  
KHOG WKDW WKH H[HUFLVH RI GLVFUHWLRQ LQ YDOXLQJ V  
QHHGV WR EH WHVWHG E\ GLVDVHVPEOLQJ WKH VPHOWHU  
GHVLJQHG DQG DVVHVVLQJ HDFK FRPSRQHQW DW HDFK  
FDOFXODWH LWV YDOXH LQ LWV PROWHQ VWDWH ,W F  
LPPHGLDWHO\ EH ORVW

7KHUH LV QR LPSHGLPHQW LQ WKHRU\ RU SUDFWLFH WR  
UHIOHFW WKH UHDOLW\ WKDW WKH H[HUFLVH RI GLVFUHW  
DXWRPDWLRQ LV QHFHVVDULO\ D SURFHVV UDWKHU WKDQ  
RXWOLQHG E\ WKH \$5& 5HSRUW RI DQG DV XSGDW  
&RPPRQZH DOWK 2PEXGVPDQ HW DO ,W DOVR UH  
H[HUFLVH RI GLVFUHWLRQ IURP WKH KXPDQ GHFLVLRQV  
YDOLGDWLRQ RSHUDWLRQ DQG PRQLWRULQJ RI WKH PRG

/HJLVODWLYH RU UHJXODWRU\ FKDQJHV RU MXGLFLDO GH  
FDQ DOWHU WKH EDVLV IRU WKH H[HUFLVH RI GLVFUHW  
DGYDQFHG DXWRPDWLRQ DV WKH PRGHO ZLOO QR ORQJHU  
XSGDW HV DUH FDSDEOH RI DXWRPDWLF LQWHJUDWLRQ (P  
PRQLWRULQJ YDOLGDWLRQ DQG TXDOLW\ DVVXUDQFH ZR  
ZD\ DV ZULWWHQ PDWHULD OV DUH XSGDW HG IRU XVH E\ G  
ZKHUH WKH ODZ FKDQJHV VR WRR VKRXOG DOO HOOPHQW

H-RXUQDO RI 7D[ 5HVHDUFK

7D[ 2IILFHU

WKH H[HUFLVH RI GLVFUHWLRQ DQG

OHJDOLW\ DUH IRU WKH UHSRVLWRU\ RI WKH UHOH\ FRQWURO IRU WKH UHSRVLWRU\ DORQH

\*DOOLJDQ S H[DPLQHV D WKH RUHWLFDO IRUPXOD\ IRU DQ GPLQLVWUDWLWYH ODZ GHFLVLRQ ZKLFK LV HTXD\ QRQ UHYLHZDEOH WD[ GPLQLVWUDWLWQ GHFLVLRQV %H

D WKDW DQ\ H[HUFLVH RI SRZHV E\ EDVHG RQ UH DSSOLHG FRQVLVWHQWO\ IDLUO\ DQG LPSDUWLDOO\ UHODWHG WR D IUDPHZRUN RI HTXDOO\ LQWHOOLJL DQG UXOHV LQ JHQHUDO VWDQGDUGV ZKLFK FDQ EH WKH EDVLV RI GHOHJDWHG DXWKRULW\ F WKDW LQ WKHUH EH FRPSOLDQFH ZLWK JHQHUDO FULWLFDO F WKHVH IRXQGDWLRQV PRUH GHWDLOHG DQG VSHFLIL\ VLJQLILFDQFH LV WKDW WKH\ JR WRZDUGV UHJXOD\ FLWL]HQV DQG WKH VWDWH E\ VWLSXODWLQJ WKH S\ VDWLVILHG LI WKH H[HUFLVH RI RIILFLDO SRZHV L\ OHJLWLPDWH ,Q SDUWLFXODU WKH\ HOLPLQDWH GH FKDQFH RU ULWXDO WKH\ SURYLGH WKH EDVLV I\ DUELWUDULQHV\ IRU GHYHORSLQJ JHQHUDO VWDQ\ H[HWHQGLQJ WKH UHTXLUHPHQWV RI IDLU SURFHGXUH\ GHFLVLRQ PDNLQJ WR H[HWHUQDO SXEOLF VFUXWLQ\ ZKLFK WKH GHFLVLRQ PDNHU FDQ KDYH D FULWLFDC\ DQG WKHUH LV D EDVLV IRU OHJDO DQG MXGLFLDO F

7KH LPSRUWDQFH RI WKHVH HOHPHQWV WR HIIHFVLYH



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7D[ 2IILFHU

WKH H[HUFLVH RI GLVFUHWLRQ DQG

SXEOLF WUXVW LQ DQ \$, VXSSRUWHG V\VWHP \*DYDJKDQ  
FRPSDQLHV JOREDOO\ KDYH PLVXVHG \$, VXIILFLHQWO\ WR  
&RQFHUQV DERXW GXH SURFHVV ELDV GLVFULPLQDWLR  
SULYDF\ EODWDQW PLVXVH RU WKHIW RI GDWD DQG LQW  
FRQVLGHUDWLRQ RI HWKLFDO DQG KXPDQ ULJKWV LVVXH  
HYLGHQFHG WKURXJKRXW WKH \$+5& 5HSRUW DQG LQ WKH

7KH SULQFLSOHV RI GPLQLVWUDWLYH ODZ DUH VXIILFLH  
GHFLVLRQ PDNLQJ DQG VSHFLILFDOO\ IRU WKH SXUSRVH  
ZKHUH GLVFUHWLRQ LV H[HUFLVHG SURYLGHG LW IRFXVH  
D VLQJOH KXPDQ HQG SRLQW +RZHYHU DW WKLV HDUO\  
VKRXOG VXSSRUW WKH H[HUFLVH RI GLVFUHWLRQ DV D S  
LQWHUYHQWLRQV LQ WKH VL[ VWHSV RI DQ \$, VXSSRUW  
DSSURDFK WDNHQ LQ WKH &WK \*XLGH &RPPRQZH DOW

OF\*UHJRU OXUUD\ DQG 1J S DUJXH WKDW DQ ,  
/DZ )UDPHZRUN SURYLGHV WKH DSSURSULDWH EDVLV WR

WDNH DGYDQWDJH RI ERWK FXUHHQW DQG IXWXU  
VDIHJXDUGV PRQLWRULQJ DQG RYHUVLJKW DQG  
DFFHSWHG XQGHUVWDQGLQJV DV WR WKH FRQGXFW  
JXLGDQFH ZLWK UHVSHFW WR WKH FLUFXPVWDQFHV  
PDNLQJ PD\ EH HPSOR\HG

,Q WKH \$, FRQWH[W WKLV FDQ EH GHVFULEHG DV μKXPDQ  
3RJUHEQD DQG LV DGRSWHG E\ WKH \$+5& S  
ZLWK WKRVH GHYHORSHG RYHU PDQ\ \HDUV IRU WHFKQLFI  
RWKHU KLJK ULVN V\VWHPV LQYROYLQJ UHJXODWLRQ UDQ  
RFFXSDWLRQDO KHDOWK DQG VDIHW\ %HQWOH\ FK  
HQIRUFHPHQW RI WD[SD\HU ULJKWV ZKHUH WKH RSWLPD  
RI OHJDO GPLQLVWUDWLYH DQG VRFLDO LQWHUYHQWL  
TXDOLW\ DVVXUDQFH SURFHVVHV

5HJXODWLRQ JRHV VRPH ZD\ WR HQVXULQJ GHVLJQ PH  
UHVSQRQVLELOLW\ DFFRXQWDELOLW\ DQG OLDELOLW\ ,W  
UHTXLUH FHUWLILFDWLRQ \$+5& S ,W GRHV QRW  
\*DYDJKDQ HW DO SS %HYDFTXD DV LV  
UHTXLUHPHQWV QRZ VHW RXW LQ WKH &WK \*XLGH &F

5HYLHZLQJ DJDLQ WKH SULQFLSOHV RI WKH \$5& 5HSRUW  
DUH LQFUHDVLQJO\ HPEHGGHG LQ GHFLVLRQ PDNLQJ D  
GHOLYHULQJ RQ LWV &RUSRUDWH 3ODQ \$72 7KH SU  
\$+5& 5HSRUW ZKHUH KXPDQV DUH LQYROYHG LQ GHV  
DQG PRQLWRULQJ WKH V\VWHP WKDW DLGV RXWSXWV O  
GHPRQVWUDWH KRZ LPSRUWDQW WKH HDUOLHU VVHSV DU  
RI WKH RXWSXWV &RPPRQZH DOWK 2PEXGVPDQ HW DO  
ORQJHU EH OHIW WR D VLQJOH HQG SRLQW GHFLVLRQ PDN

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7KHVH FRQFHUQV DUH UHIOHFWHG LQWHUQDWLRQDOO\ &RXQFLO RI (   
'LPHQVLRQV RI \$XWRPDWHG 'DWD 3URFHVVLQJ DQG 'LIIHUVHQW )RUPV R



H-RXUQDO RI 7D[ 5HVHDUFK

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WKH H[HUFLVH RI GLVFUHWLRQ DQG

LQ LVVXHV VXFK DV GLVFULPLQDWLRQ ELDV DQG IDLUQ  
DGPLQLVWUDWLYH ODZ SULQFLSOHV DUH XSKHOG )UHC  
FRQWLQXLQJ UHVSQRQVLYHQHVV WR VXFK GHYHORSPHQWV  
LGHQWLILHG DV FULWLFDO WR FRPSOLDQFH DQG FRQW  
HQJDJHPHQW ZLWK WKH WD[ V\VWHP %HYDFTXD \$72

\$'0,1,675\$7,9( /\$: %< '(6,7#( +80\$1 ',0(16,21

,Q WKH FRQWH[W RI GLJLWDO JRYHUQPHQW %HQWOH\  
DQG FDSDLOLWLHV UHTXLUHG IRU WKH SURSHU H[HUFLV  
2(&' QDWLRQDO JRYHUQPHQWV DQG RWKHU FRPPHQWDWR  
WUXVW DQG SXEOLF YDOXH 6FRWW 'H/RQH \*ROGHQ  
)UHQFK S DQG WKH \$XVWUDOLDQ 3XEOLF 6HUYL  
RI WKH IXQGDPHQWDO FKDOOHQJHV LV WKDW WKH 3XE  
DGPLQLVWUDWLRQ WKH \$72 KDV OLPLWHG FDSDLOLW\  
SULQFLSOHV

\$V D EDVLV IRU WKH GHVLJQ GHYHORSPHQW LPSOHPHQV  
DQG HPHUJLQJ V\VWHP LW LV IXQGDPHQWDO WR WKH G  
FDSDLOLWLHV DUH SUHVHQW DQG GHPRQVWUDEOH WR  
%HQWOH\ S :KLOH %HQWOH\ GUDZV WRJHV  
UHTXLUHG IRU GLJLWDO WD[ DGPLQLVWUDWLRQ WKHUH  
GHVLJQ DQG LPSOHPHQWDWLRQ RI D YDOLG DQG HIIHFV  
7KHVH DUH FRQVLVWHQW ZLWK WKH \$72 &RUSRUDWH 3ODC  
\*XLGH &RPPRQZH DOWK 2PEXGVPDQ HW DO DQG FD  
%HQWOH\ SS

x UHOHYDQW WD[DWLRQ GRPDLQ VSHFLDOLVDWLRQ EULQ  
GHFLVLRQ PDNLQJ SURFHV 7KRVH H[KLELWLQJ VXFK V  
WKH GHOHJDWHG GHFLVLRQ PDNHU RU ZRXOG EH UHIHU  
FRPSOH[ GHFLVLRQV

x OHJDO GRPDLQ VSHFLDOLVDWLRQ DV UHTXLUHG WR HQV  
H[WHUQDO UHJXODWRU\ DQG DGPLQLVWUDWLYH ODZ UH

x DXGLW ULVN DQG TXDOLW\ DVVXUDQFH GRPDLQ VSHFLD  
WHVWLQJ DQG PRQLWRULQJ RI V\VWHPV ZLWK HIIHF  
DSSURSULDWH PLWLJDWLRQ

x H[SHUWLvh LQ KXPDLQ FHQWUHG GHVLJQ ZKLFK FD  
SV\FKRORJLVWV HWKQRJUDSKHUV DQDO\VWV DQG SUR  
WKH WD[ μH[SHULHQFHV\ ZLWKLQ WKH WD[ DGPLQLVWU  
PRGHOV DW HDFK VWDJH RI WKDW H[SHULHQFH 7KLV  
FRPSRQHQWV RI WKH GHFLVLRQ PDNLQJ SURFHVWR V  
SXEOLF YDOXH ZLWKRXW UHPRYLQJ WKH UHTXLUHPHQW

x H[SHUWLvh LQ WUDQVGLVFLSOLQDU\ LQWHJUDWLRQ  
PHWKRG RORJLHV WR HQVXUH YDOLG PRGHOV IRU DX  
FDSDLOLWLHV DUH SDUWLFXODUO\ LPSRUWDQW LQ H  
GHOLYHUV WKH WHFKQRORJLFDO VROXWLRQV UHTXLUH  
PDNLQJ SURFHVWR WKDW PHHW WKH UHTXLUHPHQWV RI  
DQG

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WKH H[HUFLVH RI GLVFUHWLRQ DQG

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H-RXUQDO RI 7D[ 5HVHDUFK

7D[ 2IILFHU

WKH H[HUFLVH RI GLVFUHWLRQ DQG

7KH LPSRUWDQW DGGLWLRQDO FRPSRQHQW IRU WKH RSIUDPHZRUN GLJLWDO JRYHUQPHQW DQG GLJLWDO WD[ DCWR GHOLYHU LW 7KH DUWLFOH RXWOLQHV WKH SULPDU\ EXLOG WHVW LPSOHPHQW PRQLWRU DQG UHYLHZ \$, V\VJRYHUQPHQW JRHV WR VFDOH WKH \$36 KDV DOUHDG\ LGILWV ZRUNIRUFH \$36 \$ IDLOXUH WR UPHHG\ WKH SRVLQ WKH WD[ DGPLQLVWUDWLRQ VSHFLILFDOO\ DQG GLJLWDO

,QWHUHVWLQJO\ WKH WZR H[DPSOHV RI EDVLF DXWRPDWWR WZR RI WKH IXQGDPHQWDO LVVXHV ZKLFK GHPDQG DWKH FRPSOHWH GHFLVLRQ PDNLQJ SURFHVV DQG RQH RFRQVHTXHQFH ,Q EBRVQ W\ BNEHRKSGUREJW DDQPG QJ RI WKH EDVLF ZDV LPSUHFLVH &RPSXWHUV DUH SUHFLVH DQG OLWHUDZLWK ZKLFK WKH\ DUH SURJUDPPHG 7KHUH LV QR URRPI VHFRQG LVVXH LOOXVWUDWHG LV WKDW KXPDQV WHQG WV\VWHP FDQ GR WKHLU ZRUN IRU WKHP ,W ZDV SRLQWHQ5RER GHEW V\VWHP &RPPRQZH DOWK 2PEXGVPDQ HYLGHQIFQHWLDQULFK

7KH FRQVHTXHQFH LV LQHTXLW\ LQ GHFLVLRQ PDNLQJ KLQ WKH &WK \*XLGH &RPPRQZH DOWK 2PEXGVPDQ HW DQ DUWLILFLDO PRPHQWDU\ SRLQW LQ WLPH FDQ FRQ

H-RXUQDO RI 7D[ 5HVHDUFK

7D[ 2IILFHU

WKH H[HUFLVH RI GLVFUHWLRQ DQG

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\$FNHUPDQ 5%FRQVWUXFWLQJ \$IPYHOUED8QQ DYDZUVLW\ 3UHVV &DPEULC  
\$GPLQLVWUDWLHYH 5HYLHZ &RXQFLO \$5& μ\$XWRPDWHG DVVLV  
5HSRUW WR WKH \$WWRUQH\ \*HQHUDOT\ \$GPLQLVWUDWLHYH 5HY  
\$OEX 2 % )O\YHUERP 0 μ2UJDQL]DWLRQDO WUDQVSDUHQF\

H-RXUQDO RI 7D[ 5HVHDUFK

7D[ 2IILFHU

WKH H[HUFLVH RI GLVFUHWLRQ DQG

&RJOLDQHVH & /HKU ' μ5HJXODWLQJ E\ URERW \$GPLQLVWU  
OHDUQL\*QIRUHJLWZRZQ /DYRORXUQDOOR SS

&RJOLDQHVH & /HKU ' μ7UDQVSDUH\$QFRLOQQGWDOQJRLULHWKDZ  
5HYLHYRO QR SS

&RPPRQZH DOWK 2P&XQWPLDQOLQNTV DXWRPDWHG GH EW UDLVLQJ DC  
DERXW WKH 'HS DUWPHQW RI +XPDQ 6HUYLHV RQOLQH FRP  
UDLVLQJ DQG HUSRFURW HUR &DQEHUUD \$SULO

&RPPRQZH DOWK 2PEXGVPDQ 2IILFH RI WKH \$XVWUDOLDQ ,QIRU  
\*HQHUDOIV 'HS DSUXWPRPDWHG GHFLVLRQ PDNLQJDCEHWWIBU SUD  
\$YDLODEOH DW KWWSV ZZZ RPEXGVPDQ JRY DX SXEOLFDWL  
GHFLVLRQ JXLGH

&RXQFLO RI (XURSH &RPPLWWHH RI ([SHUWV RQ +XPDQ 5LJKWV 'L  
DQG 'LIIHUhQW )RUPV RI \$UWLILFLDO ,QW \$OONLXQJRH WKAHHXQ  
LPSOLFDWLRQV RI DGYDQFHG GLJLWDO WHFKQRORJLHV LQF  
UHVSRQVLELOLW\ ZLWKLQ &RKXQDLOQ URLJKXWUR SUHD BHZ&JN '\*,  
6WUDVERXUJ

'DWW . :RHOQHBLQW DUDLJDKKTHFKQLFDO DDQGHW &RIRFD \$QLWVHJWLTW  
/DZ 5HYLHYRO SS

'HIOHP O 6RFLRORJ\ RI ODZ 9LVLRQV &D PDE WLFRHO BQOYHWWWDQW  
&DPEULGJH

'HS DUWPHQW RI ,QGXVWU\ 6FLHQFH DQG 5HVRXUFHV \$XVWUDOLD  
IUDPHZRUNI &DQEHUUD 1RYHPEHU \$YDLODEOH DW KWW  
SXEOLFDWLRQV DXVWUDOLDV DUWLILFLDO LQWHOOLJHQFH HW

'HUULGD - μ/HWWHU WR D - DSDQHVH IULHQGTHUHSQBGXFHG  
DQG GLIIIPWDQBXLD 3UHVV :DUZLFN SS

'LJLWDO 7UDQVIRUPDWLRQ &RJHSQFW DWT\$ SO&QEHUUD \$XJXVW  
KWWSV ZZZ GWD JRY DX QHZV GWD UHOHDVHV FRUSRUDWH S

'ZRUNLQ 5DNLQJ ULJKWQHIZHUGQXVHDUG 'XFNZRUWK DQG &R /RQ

)R[ - μ7KH XQFHUWDLQ UHODWLRQVKLS BHMHZDHSQHQUWDQVS D  
3UDFWMLFQI QR SS

)UHPRQW - μ&RPSXWHUL]HG DGPLQLVWUDWLWJHR RGHTL+VLCQ PDM  
/DZ - RXUYQDQI QR SS

)UHQFK -XVWL FH 5 6 μ\$X\$GLIRUDORUH YLSHZ ULJKWV

\*DOOLJDQ 'LWFUHWLRQDU\ SRZHV \$ OHJDQIRWQGQBYHRUMLFWD QUGH  
2[IRUG

\*DQJO . +RIPDQQ ( .LUFKOHU ( μ7D[ DXWKRULWLHV LQWH



H-RXUQDO RI 7D[ 5HVHDUFK

7D[ 2IILFHU

WKH H[HUFLVH RI GLVFUHWLRQ DQG

2UJDQLVDWLRQ IRU (FRQRPLF & R RSHUDWWBQHQDQG LRSOERIRHMQDW  
WKH 2(&' \$, SULQFLSOHV , QVLJKWV& IURPLWDV LFRQQQP\$, 3SDPSOHLL  
2(&' 3XEOLVKLQJ 3DULV

2UJDQLVDWLRQ IRU (FRQRPLF & R RSHUDWLZRDQ DQBLQHLYMWDQDSPLRQ  
& RPSDUDWLYH , QIRUPDWLRQ RQ 2(&' DQG RWKHU DGYD  
2(&' 3XEOLVKLQJ 3DULV

2UJDQLVDWLRQ IRU (FRQRPLF & R RSHUDWLZRDQ DDQPLQHWWOBWRQ  
& RPSDUDWLYH LQIRUPDWLRQ RQ 2(&' DQG RWKHU DGYD  
2(&' 3XEOLVKLQJ 3DULV

5DZOV -