Values of government subsidies

MODEL	Decisions				Note
	e^*	r^*	l^*	p^*	
constraint	When $Cv < H(\alpha) \mid \alpha \in (\underline{\alpha}, \alpha_0)$, $l = l^*$				$H(\alpha)=\frac{(1+d)^4 (1-\alpha)^2+(1+d)^2 * 8 (1-\alpha)[2\alpha k+\theta(1-\alpha)]+16\theta^2(1-\alpha)^2-192\alpha^2 k^2-64}{256 k(-1+\alpha)^2}$ $\underline{\alpha}=\frac{(1+d)^2+4\theta-16k}{(1+d)^2+4\theta-8k}$, $\alpha_0=\frac{(1+d)^4+8(1+d)^2(\theta-k)+16\theta(\theta-10k)+16k\sqrt{(1+d)^2+48\theta(\theta-4k)}}{(1+d)^4+8(1+d)^2(\theta-2k)+16\theta(\theta-4k)-192k^2}$
V(IG-I)	$\frac{8\alpha g}{16(1-\alpha)} > 0$	$\frac{-\beta 8\alpha g}{16(1-\alpha)} < 0$	$8\alpha g$ / ~~$16(1-\alpha)$~~ 8(1-α)^2 > 0	0	
V (BG-B	$\frac{8\alpha g}{16(1-\alpha)} > 0$	$\frac{-\beta 8\alpha g}{16(1-\alpha)} < 0$	$\frac{8\alpha g}{16(1-\alpha)} > 0$	0	The same to V(G-I)
	When $Cv > H(\alpha) \mid \alpha \in (\underline{\alpha}, \alpha_0)$, $l = l^{VA}$				$l^{VA}=\frac{-2k\alpha+(-1+\alpha)\theta+2\sqrt{k}\sqrt{cv(-1+\alpha)^2+k\alpha^2+\theta-\alpha\theta}}{(-1+\alpha)^2}$
Values (IG-I)	0	0	0	0	There is no improvement on optimal decisions when government provide subsidies in this situation.
V (BG-B	0	0	0	0	There is no improvement on optimal decisions when government provide subsidies in this situation.

MODEL	VProfit				Note
	π_{SO}	π_{VM}	CS	SW	
constraint	When $Cv < H(\alpha) \mid \alpha \in (\underline{\alpha}, \alpha_0)$, $l = l^*$				$H(\alpha)=\frac{(1+d)^4 (1-\alpha)^2+(1+d)^2 * 8 (1-\alpha)[2\alpha k+\theta(1-\alpha)}{256 k}$ $\underline{\alpha}=\frac{(1+d)^2+4\theta-16k}{(1+d)^2+4\theta-8k}$, $\alpha_0=\frac{(1+d)^4+8(1+d)^2(\theta-k)+16\theta(\theta-1}{(1+d)^4+8(1+d)^2(\theta-2}$
Values (IG-I)	$\frac{\varphi^2-\varnothing^2}{128k(1-\alpha)^2}+\frac{g\alpha\theta}{(1-\alpha)}+gC_S$	$\frac{\varphi^2-\varnothing^2+32\alpha k[\varphi-\varnothing]}{256k(1-\alpha)^2}$	0	$\frac{3\varphi^2-3\varnothing^2+256\alpha kg[\alpha k+\theta(1-\alpha)]}{256k(1-\alpha)^2}+gC_S$	Always >0
V (BG-B	$\frac{\lambda^2-\eta^2}{128k^B(1-\alpha)^2}+\frac{g\alpha\theta}{(1-\alpha)}+gC_S$	$\frac{\lambda^2-\eta^2+32k^B\alpha(\lambda-\eta)}{256k^B(1-\alpha)^2}$	0	$\frac{\lambda^2-\eta^2+256k^B g\alpha[\theta(1-\alpha)+k^B\alpha]}{128k^B(1-\alpha)^2}+gC_S$	Always >0
	When $Cv > H(\alpha) \mid \alpha \in (\underline{\alpha}, \alpha_0)$, $l = l^{VA}$				$l^{VA}=\frac{-2k\alpha+(-1+\alpha)\theta+2\sqrt{k}\sqrt{cv(-}}{(-1+\alpha)^2}$
V(G-I)	$g[\frac{(w-\alpha k)\alpha}{2(1-\alpha)^2}-\frac{\alpha\theta}{(1-\alpha)}+C_S]$	0	0	$g[\frac{(w-\alpha k)\alpha}{2(1-\alpha)^2}-\frac{\alpha\theta}{(1-\alpha)}+C_S]$	When $C_S > \frac{\alpha\theta}{(1-\alpha)}-\frac{(w-\alpha k)\alpha}{2(1-\alpha)^2}$ SO is benefit
V(BG-B)	$g[\frac{(\mu-\alpha k^B)\alpha}{2(1-\alpha)^2}-\frac{\alpha\theta}{(1-\alpha)}+C_S]$	0	0	$g[\frac{(\mu-\alpha k^B)\alpha}{2(1-\alpha)^2}-\frac{\alpha\theta}{(1-\alpha)}+C_S]$	

Values of blockchain

MODEL	Decisions				Note
	e^*	r^*	l^*	p^*	
constraint	When $Cv < H(\alpha) \mid \alpha \in (\underline{\alpha}, \alpha_0)$, $l = l^*$				$H(\alpha)=\frac{(1+d)^4(1-\alpha)^2+(1+d)^2*8(1-\alpha)[2\alpha k+\theta(1-\alpha)]+16\theta^2(1-\alpha)^2-192\alpha^2k^2-64}{256k(-1+\alpha)^2}$ $\underline{\alpha}=\frac{(1+d)^2+4\theta-16k}{(1+d)^2+4\theta-8k}$, $\alpha_0=\frac{(1+d)^4+8(1+d)^2(\theta-k)+16\theta(\theta-10k)+16k\sqrt{(1+d)^2+48\theta(\theta-4k)}}{(1+d)^4+8(1+d)^2(\theta-2k)+16\theta(\theta-4k)-192k^2}$
V (B-I)	$\frac{k\eta-k^B\varnothing}{16kk^B(1-\alpha)}>0$	$\beta\frac{k^B\varnothing-k\eta}{16kk^B(1-\alpha)}<0$	$\frac{k\eta-k^B\varnothing+8\theta(1-\alpha)(k^B-k)}{16kk^B(1-\alpha)}>0$	$\frac{b}{2}>0$	With the implementation of BEL, e/l/p all increase. The premium rate decreases.
V (BG-IG)	$\frac{k\lambda-k^B\varphi}{16kk^B(1-\alpha)}>0$	$\beta\frac{k^B\varphi-k\lambda}{16kk^B(1-\alpha)}<0$	$\frac{k\lambda-k^B\varphi+8\theta(1-\alpha)(k^B-k)}{16kk^B(1-\alpha)}>0$	$\frac{b}{2}>0$	The same as (VB-I)
	When $Cv > H(\alpha) \mid \alpha \in (\underline{\alpha}, \alpha_0)$, $l = l^{VA}$				$l^{VA}=\frac{-2k\alpha+(-1+\alpha)\theta+2\sqrt{k}\sqrt{cv(-1+\alpha)^2+k\alpha^2+\theta-\alpha\theta}}{(-1+\alpha)^2}$
V (B-I)	$\frac{k\mu-k^Bw-\alpha k^B}{kk^B(1-\alpha)}>0$	$\frac{\beta(k^Bw-k\mu)}{kk^B(1-\alpha)}<0$	$\frac{2(\mu-w)+2\alpha(k-k^B)}{(1-\alpha)^2}>0$	$\frac{b}{2}>0$	
V (BG-IG)	$\frac{k\mu-k^Bw-\alpha k^B}{kk^B(1-\alpha)}>0$	$\frac{\beta(k^Bw-k\mu)}{kk^B(1-\alpha)}<0$	$\frac{2(\mu-w)+2\alpha(k-k^B)}{(1-\alpha)^2}>0$	$\frac{b}{2}>0$	同 V（B-I)

MODEL	VProfit				Note
	$V\pi_{SO}$	$V\pi_{VM}$	VCS	VSW	
constraint	$\underline{\alpha}=\frac{(1+d)^2+4\theta-16k}{(1+d)^2+4\theta-8k}$, $\alpha_0=\frac{(1+d)^4+8(1+d)^2(\theta-k)+16\theta(\theta-10k)+16k\sqrt{(1+d)^2+48\theta(\theta-4k)}}{(1+d)^4+8(1+d)^2(\theta-2k)+16\theta(\theta-4k)-192k^2}$ When $Cv < H(\alpha) \mid \alpha \in (\underline{\alpha}, \alpha_0)$, $l = l^*$				$H(\alpha)=\frac{(1+d)^4(1-\alpha)^2+(1+d)^2*8(1-\alpha)[2\alpha k+\theta(1-\alpha)]+16\theta^2}{256k(-1+\alpha)^2}$ $\underline{\alpha}=\frac{(1+d)^2+4\theta-16k}{(1+d)^2+4\theta-8k}$, $\alpha_0=\frac{(1+d)^4+8(1+d)^2(\theta-k)+16\theta(\theta-10k)+16k}{(1+d)^4+8(1+d)^2(\theta-2k)+16\theta(\theta-}$
V (B-I)	$\frac{k\eta^2-k^B\varnothing^2}{128kk^B(1-\alpha)^2}-C_{SB}$, when $C_{SB}<\frac{k\eta^2-k^B\varnothing^2}{128kk^B(1-\alpha)^2}$, the SO is benefit. ($C_{SB}<\frac{\Delta k(1+d)^2+k[b^2+2b(1+d)]+4\theta\Delta k}{32kk^B}-2\Delta k$)	$\frac{k\eta^2-k^B\varnothing^2+32\alpha kk^B(\eta-\varnothing)}{256kk^B(1-\alpha)^2}-C_{VB}$, when $C_{VB}<\frac{k\eta^2-k^B\varnothing^2+32\alpha kk^B(\eta-\varnothing)}{256kk^B(1-\alpha)^2}$, the VM is benefit.	$\frac{b^2+2b(1+d)}{8}>0$	$\frac{3k\eta^2-3k^B\varnothing^2+32\alpha kk^B(\eta-\varnothing)}{256kk^B(1-\alpha)^2}+\frac{b^2+2b(1+d)}{8}-C_{SB}-C_{VB}$ When $C_{SB}+C_{VB}<\frac{3k\eta^2-3k^B\varnothing^2+32\alpha kk^B(\eta-\varnothing)}{256kk^B(1-\alpha)^2}+\frac{b^2+2b(1+d)}{8}$	
V (BG-IG)	$\frac{k\lambda^2-k^B\varphi^2}{128kk^B(1-\alpha)^2}-C_{SB}$, when $C_{SB}<\frac{k\lambda^2-k^B\varphi^2}{128kk^B(1-\alpha)^2}$, the SO is benefit.	$\frac{k\lambda^2-k^B\varphi^2+32\alpha kk^B(\lambda-\varphi)}{256kk^B(1-\alpha)^2}-C_{VB}$, when $C_{VB}<\frac{k\lambda^2-k^B\varphi^2+32\alpha kk^B(\lambda-\varphi)}{256kk^B(1-\alpha)^2}$, the VM is benefit.	$\frac{b^2+2b(1+d)}{8}>0$	$\frac{3k\lambda^2-3k^B\varphi^2+32\alpha kk^B(\lambda-\varphi)}{256kk^B(1-\alpha)^2}+\frac{b^2+2b(1+d)}{8}-C_{SB}-C_{VB}$	Similar to V(B-I)
	When $Cv > H(\alpha) \mid \alpha \in (\underline{\alpha}, \alpha_0)$, $l = l^{VA}$				

V (B-I)	$\frac{k(\mu-\alpha k^B)[\eta-8(\mu-\alpha k^B)]-k^B(w-\alpha k)[\emptyset-8(w-\alpha k)]}{4kk^B(1-\alpha)^2}-C_{SB}$	0, no matter what the cost of blockchain, there is no effect on VM when he emplement the technology.	$\frac{b^2+2b(1+d)}{8}>0$	$\frac{k(\mu-\alpha k^B)[\eta-8(\mu-\alpha k^B)]-k^B(w-\alpha k)[\emptyset-8(w-\alpha k)]}{4kk^B(1-\alpha)^2}-C_{SB}+\frac{b^2+2b(1+d)}{8}$	
V (BG-IG)	$\frac{k(\mu-\alpha k^B)[\lambda-8(\mu-\alpha k^B)]-k^B(w-\alpha k)[\varphi-8(w-\alpha k)]}{4kk^B(1-\alpha)^2}-C_{SB}$	0	$\frac{b^2+2b(1+d)}{8}>0$	$\frac{k(\mu-\alpha k^B)[\lambda-8(\mu-\alpha k^B)]-k^B(w-\alpha k)[\varphi-8(w-\alpha k)]}{4kk^B(1-\alpha)^2}-C_{SB}+\frac{b^2+2b(1+d)}{8}$	*Similar to V(B-I)*