Impacts of general tax exemption on the tourist sector : CGE approach

Garabedian Sabine

Tourist specialisation & vulnerability
La Réunion, december 4 & 5

Outline

- What is a CGE model? Framework
- Model presentation : ExteRunT
- Simulations results

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- **What is a CGE model? Framework**
- Model presentation : ExteRunT
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Framework

- Computable General Equilibrium (CGE) are based on real economic databased and they are usually used to estimate how an economy might react to changes in policy
- CGE model consists of :
  - equations describing model variables
  - database consistent with the model equations (SAM).
- CGE are descended from the input-ouput models
- CGE can be comparative-static (more common) or dynamic

Outline

- What a is CGE model? Framework
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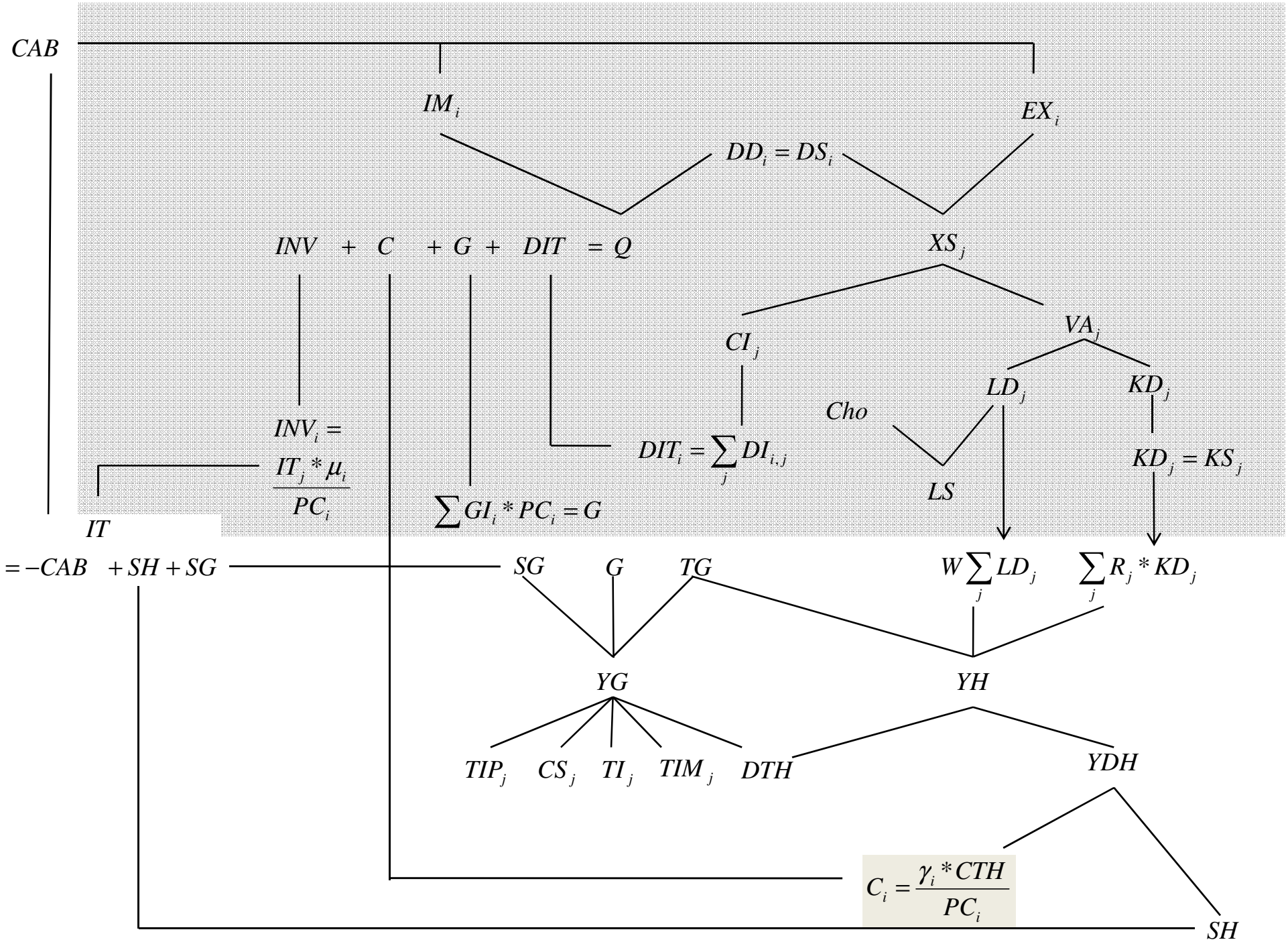
Model : ExteRunT

- Decaluwé et al. (2001)
- Social Accounting Matrix (SAM) : Réunion, 2008
- Open economy
- Static-Comparative
- Classic closure of long term equilibrium : capital stocks are allowed to adjust

- 7 industries and products:
  - Agriculture
  - Food-processing industry
  - Other industries
  - Building
  - Hotel et restoration (tourism)
  - Services
  - Non-tradable services
- 1 household
- 1 government
  - Production tax
  - Work tax
  - Product tax (TVA)
  - Importation tax


CAB
IM_i
EX_i
DD_i = DS_i
INV + C + G + DIT = Q
XS_j
CI_j
VA_j
LD_j
KD_j
Cho
INV_i = IT_j * μ_i / PC_i
DIT_i = Σ_j DI_{i,j}
LS
KD_j = KS_j
Σ GI_i * PC_i = G
IT
= −CAB + SH + SG
SG
G
TG
W Σ_j LD_j
Σ_j R_j * KD_j
YG
YH
TIP_j
CS_j
TI_j
TIM_j
DTH
YDH
C_i = γ_i * CTH / PC_i
SH

Simulations

tax	Taxe Base	Price
Production tax (tbr)	$TIP_j = tbr_j \,.\, XS_j \,.\, P_j$	$P_j = PT_j \,.\, (1 + tbr_j)$
Work tax (tcs)	$CS_j = tcs_j \,.\, LD_j \,.\, W$	$WT_j = (1 + tcs_j)\, W$
Product tax (tx)	$TI_i = tx_i \,.\, \left[\begin{array}{l} PL_i \,.\, DD_i + \\ (1 + tm_i) \,.\, e \,.\, PWM_i \,.\, IM_i \end{array} \right]$	$PD_i = (1 + tx_i)\, PL_i$ $PM_i = (1 + tx_i)(1 + tm_i) \,.\, e \,.\, PWM_i$

Choc : Tbr(trs) = 0 ; Tcs(trs) = 0 ; Tx(trs) = 0

Outline

- What is a CGE model? Framework
- Model presentation : ExteRunT
- **Simulations results**

Impacts on the tourist sector and agregate

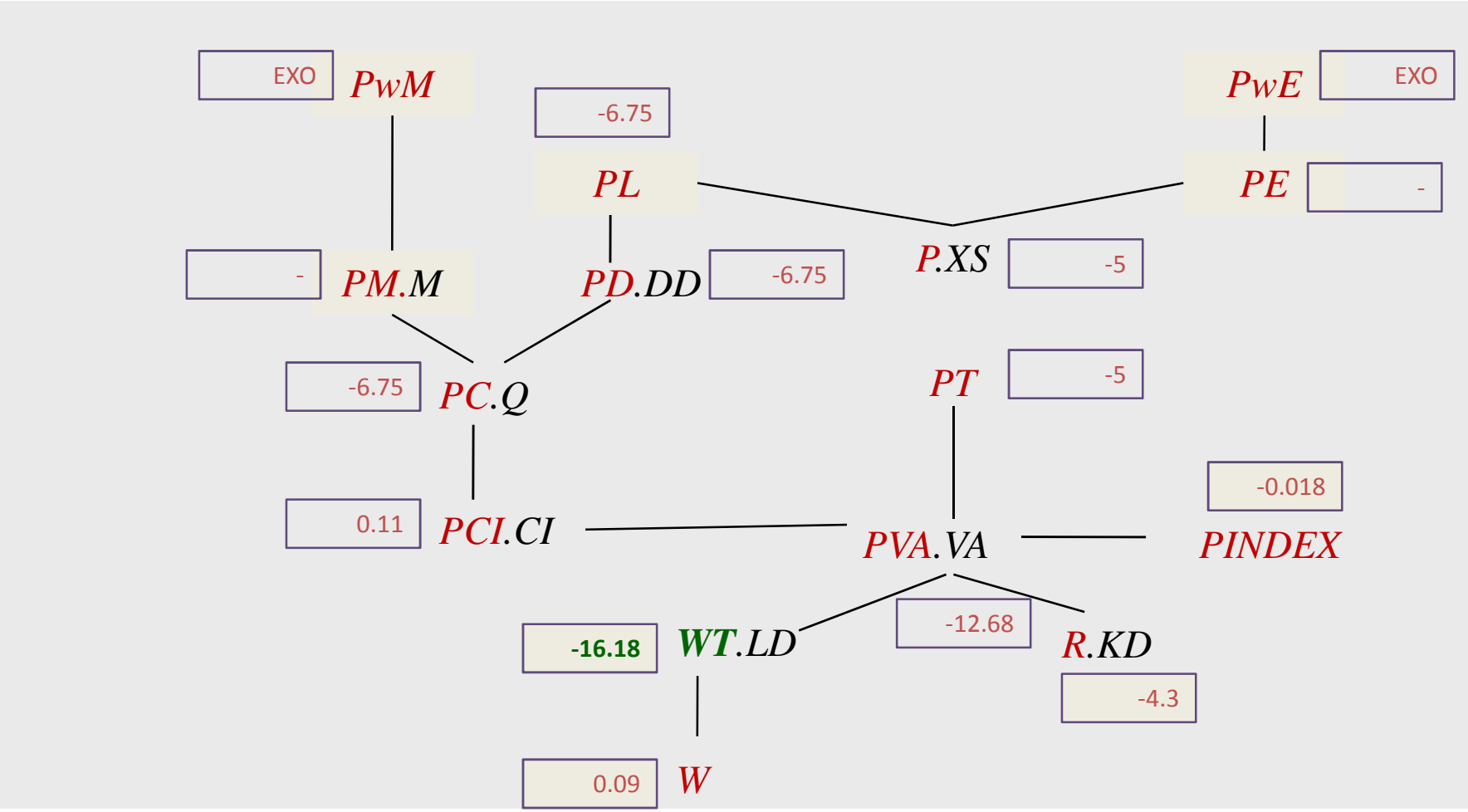
variable	ST			M		
	Trb = 0	Tcs = 0	Tx = 0	Tbr = 0	Tcs = 0	Tx = 0
XS	2,09	9,6	3,53	0,06	0,31	0,011
VA	2,09	9,6	3,53	0,04	0,22	-0,1
LD	3,03	14,17	5,15	0,07	0,4	-0,01
YH	0,05	0,26	-0,04	0,05	0,26	-0,04
INV	1,53	7,22	3,77	-0,11	-0,29	-0,5
C	1,66	7,52	4,32	0,11	0,48	0,19
DIT	0,1	0,65	0,16	0,08	0,42	0,04
Q	1,47	6,59	3,84	0,05	0,26	0,01
DD	1,47	6,59	3,84	0,03	0,21	-0,006
EX	3,92	18,4	2,59	0,76	3,53	0,58
IM	-	-	-	0,11	0,5	0,08

Impacts on the tourist sector and agregate

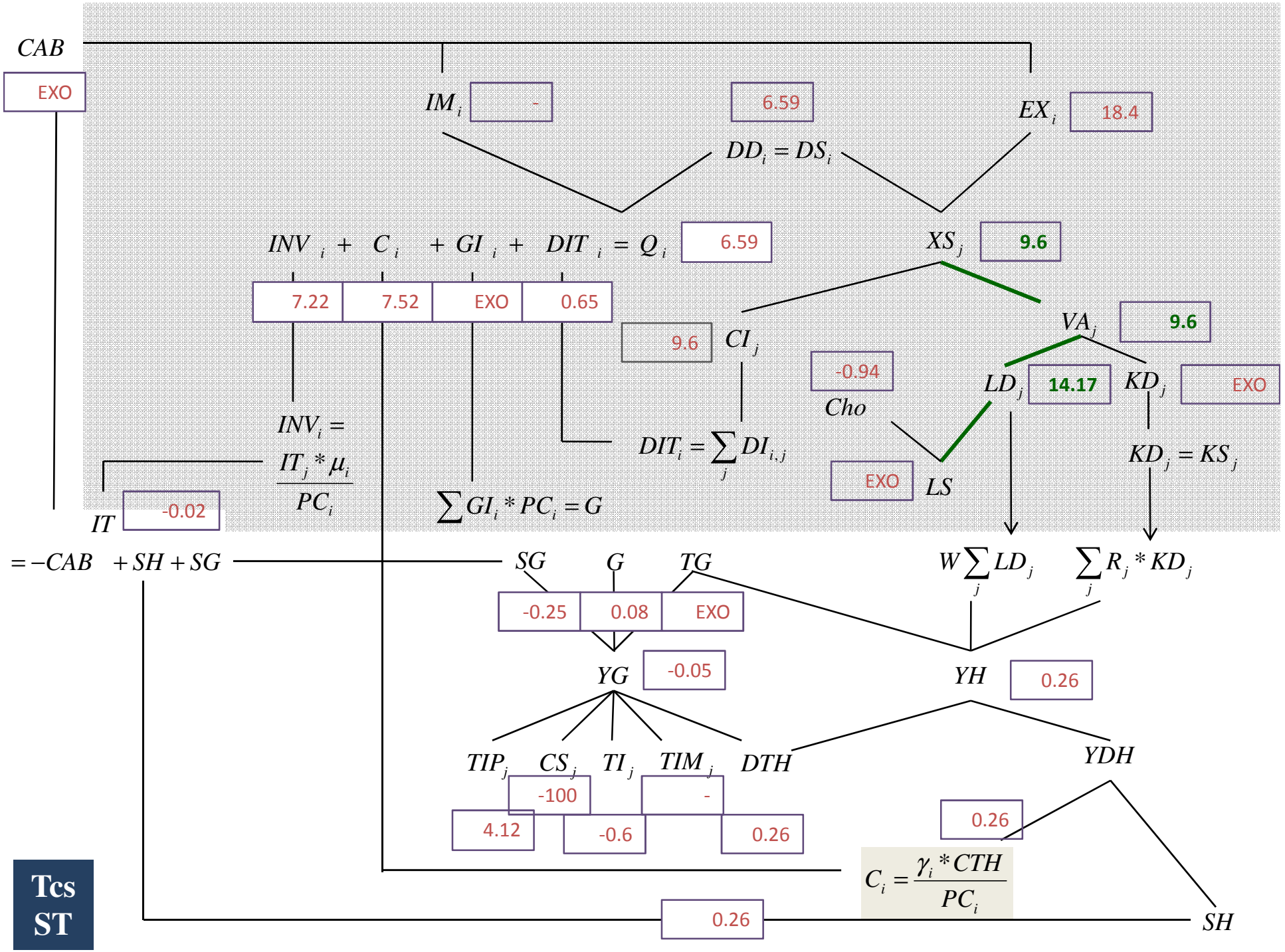
variable	ST			M		
	Trb = 0	**Tcs = 0**	Tx = 0	Tbr = 0	**Tcs = 0**	Tx = 0
XS	2,09	**9,6**	3,53	0,06	**0,31**	0,011
VA	2,09	**9,6**	3,53	0,04	**0,22**	-0,1
LD	3,03	**14,17**	5,15	0,07	**0,4**	-0,01
YH	0,05	**0,26**	-0,04	0,05	**0,26**	-0,04
INV	1,53	**7,22**	3,77	-0,11	**-0,29**	-0,5
C	1,66	**7,52**	4,32	0,11	**0,48**	0,19
DIT	0,1	**0,65**	0,16	0,08	**0,42**	0,04
Q	1,47	**6,59**	3,84	0,05	**0,26**	0,01
DD	1,47	**6,59**	3,84	0,03	**0,21**	-0,006
EX	3,92	**18,4**	2,59	0,76	**3,53**	0,58
IM	-	**-**	-	0,11	**0,5**	0,08

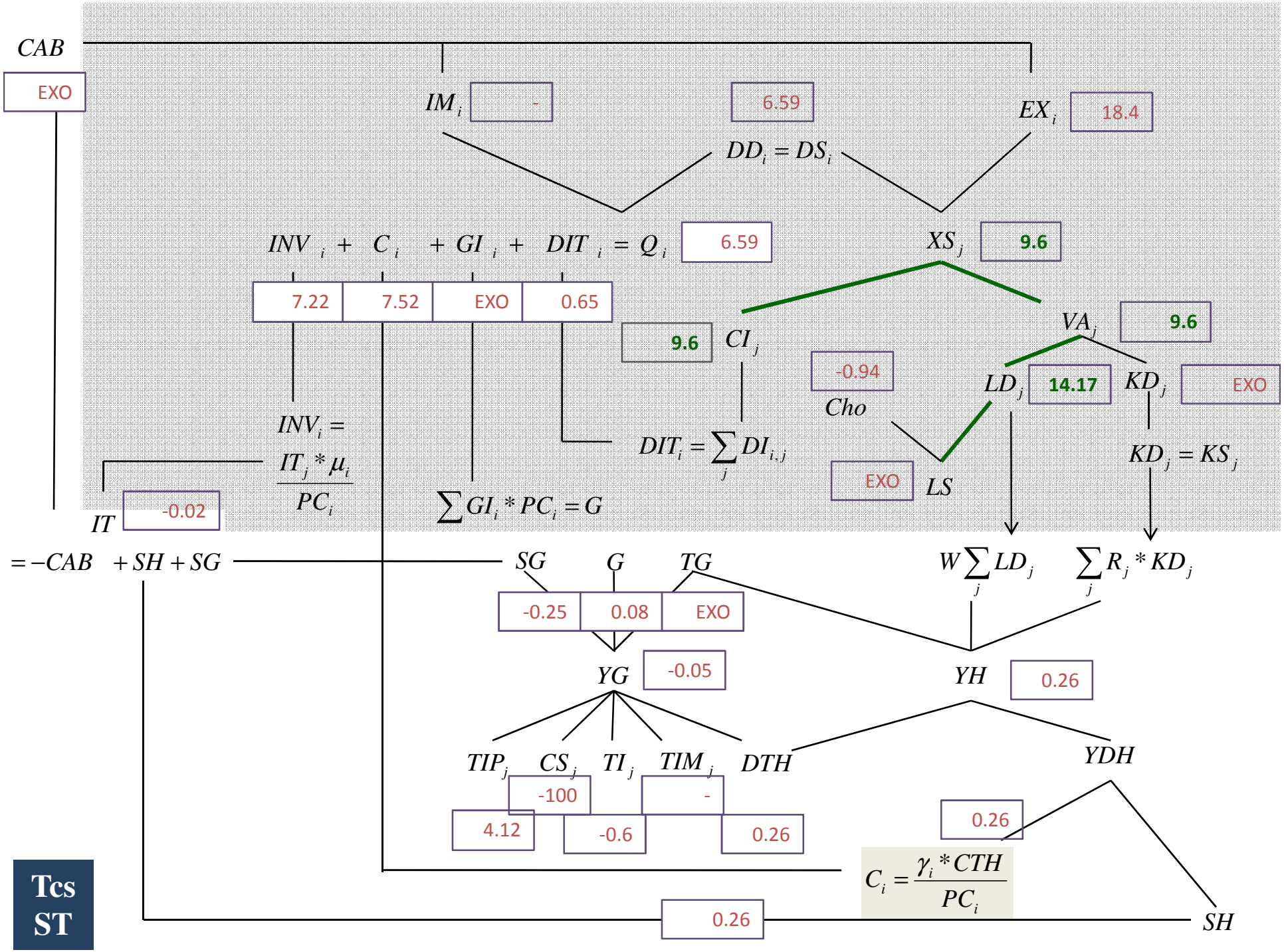
Initial situation : Tbr(trs) = 0.016 ; Tcs(trs) = **0,194** ; Tx(trs) = 0,052

Prix


EXO
PwM
-6.75
PL
PwE
EXO
PE
-
-
PM.M
PD.DD
-6.75
P.XS
-5
-6.75
PC.Q
PT
-5
-0.018
0.11
PCI.CI
PVA.VA
PINDEX
-16.18
WT.LD
-12.68
R.KD
-4.3
0.09
W

Tcs
ST


CAB
EXO
IM_i
-
6.59
$DD_i = DS_i$
EX_i
18.4
$INV_i + C_i + GI_i + DIT_i = Q_i$
6.59
XS_j
9.6
7.22
7.52
EXO
0.65
9.6
CI_j
VA_j
9.6
-0.94
Cho
LD_j
14.17
KD_j
EXO
$INV_i = \frac{IT_j * \mu_i}{PC_i}$
$DIT_i = \sum_j DI_{i,j}$
EXO
LS
$KD_j = KS_j$
IT
-0.02
$\sum GI_i * PC_i = G$
$= -CAB + SH + SG$
SG
G
TG
$W\sum_j LD_j$
$\sum_j R_j * KD_j$
-0.25
0.08
EXO
YG
-0.05
YH
0.26
TIP_j
CS_j
TI_j
TIM_j
DTH
YDH
-100
-
4.12
-0.6
0.26
0.26
$C_i = \frac{\gamma_i * CTH}{PC_i}$
0.26
SH
Tcs
ST


CAB
EXO
IM_i
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6.59
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18.4
$DD_i = DS_i$
$INV_i + C_i + GI_i + DIT_i = Q_i$
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CS_j
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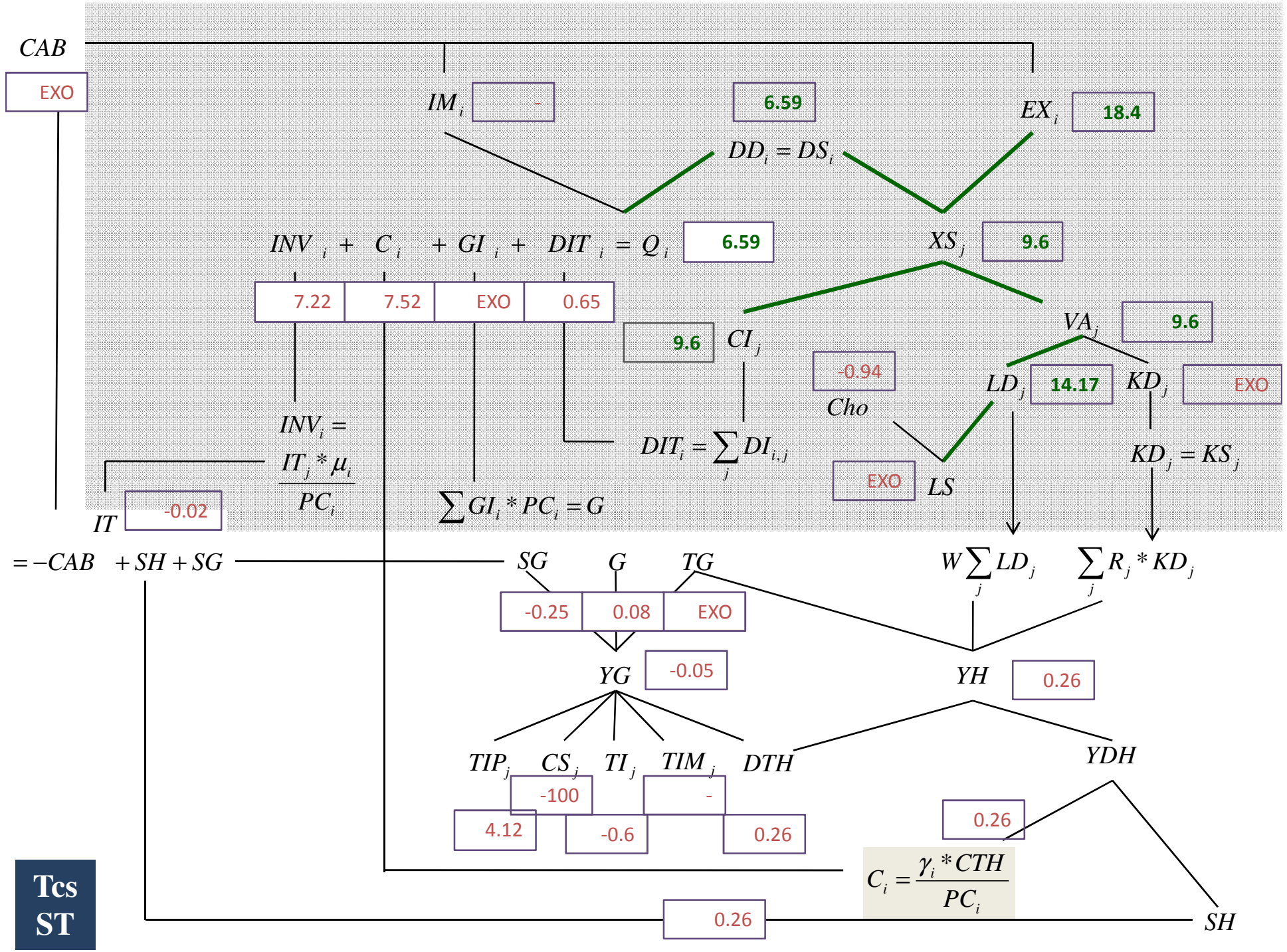
TIM_j
DTH
YDH
-100
-
4.12
-0.6
0.26
0.26
$C_i = \frac{\gamma_i * CTH}{PC_i}$
0.26
SH
Tcs
ST


CAB
EXO
IM_i
-
6.59
DD_i = DS_i
EX_i
18.4
INV_i + C_i + GI_i + DIT_i = Q_i
6.59
XS_j
9.6
7.22
7.52
EXO
0.65
9.6
CI_j
VA_j
9.6
-0.94
Cho
LD_j
14.17
KD_j
EXO
INV_i = IT_j * μ_i / PC_i
DIT_i = Σ_j DI_i,j
KD_j = KS_j
EXO
LS
IT
-0.02
∑ GI_i * PC_i = G
= −CAB + SH + SG
SG
G
TG
W Σ_j LD_j
Σ_j R_j * KD_j
-0.25
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EXO
YG
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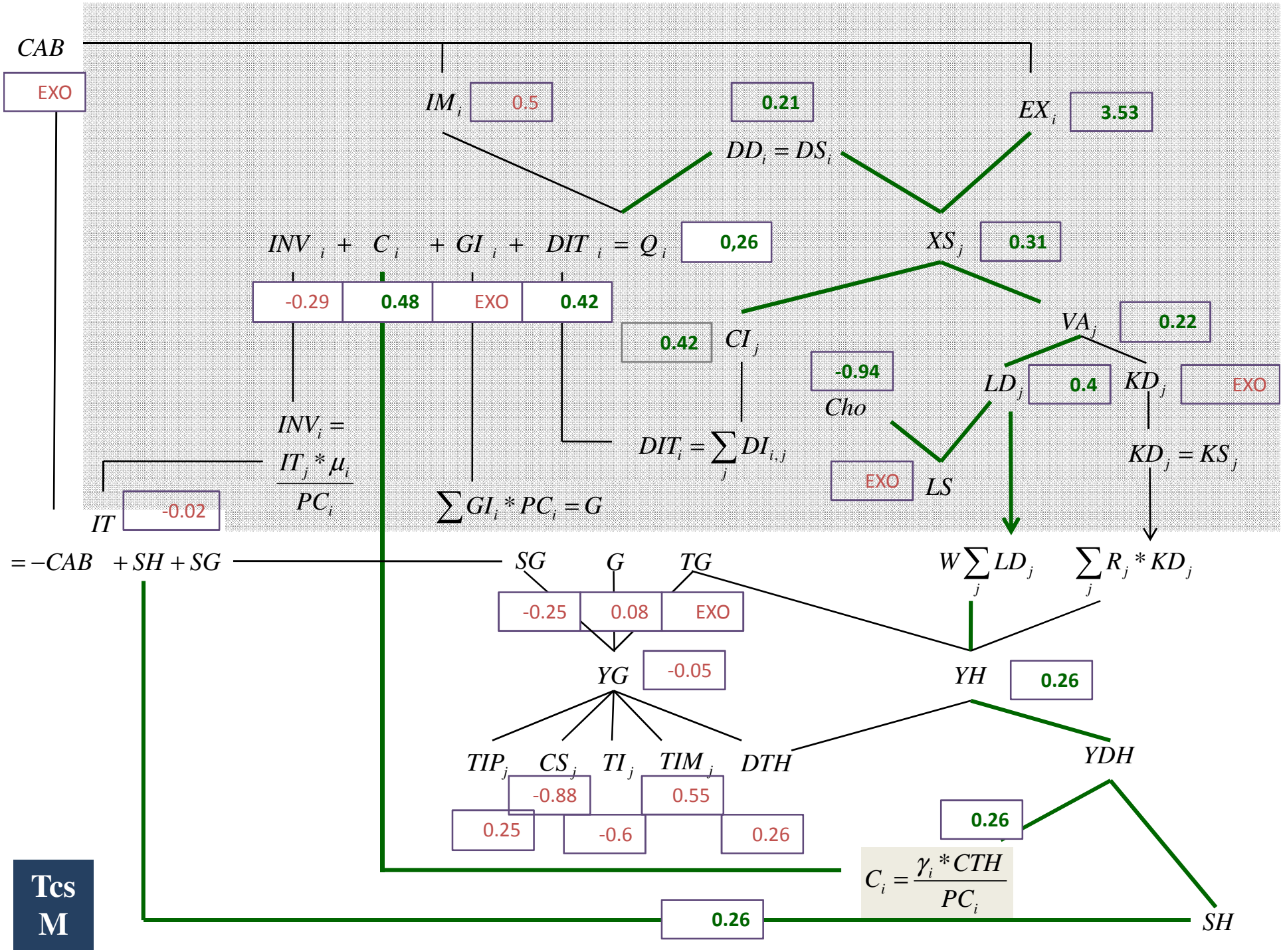
YDH
-100
-
4.12
-0.6
0.26
0.26
C_i = γ_i * CTH / PC_i
0.26
SH

Tcs ST


CAB
EXO
IM_i
0.5
0.21
$DD_i = DS_i$
EX_i
3.53
$INV_i + C_i + GI_i + DIT_i = Q_i$
0,26
XS_j
0.31
-0.29
0.48
EXO
0.42
0.42
CI_j
VA_j
0.22
-0.94
Cho
LD_j
0.4
KD_j
EXO
$INV_i = \frac{IT_j * \mu_i}{PC_i}$
$DIT_i = \sum_j DI_{i,j}$
$KD_j = KS_j$
EXO
LS
IT
-0.02
$\sum GI_i * PC_i = G$
$= -CAB + SH + SG$
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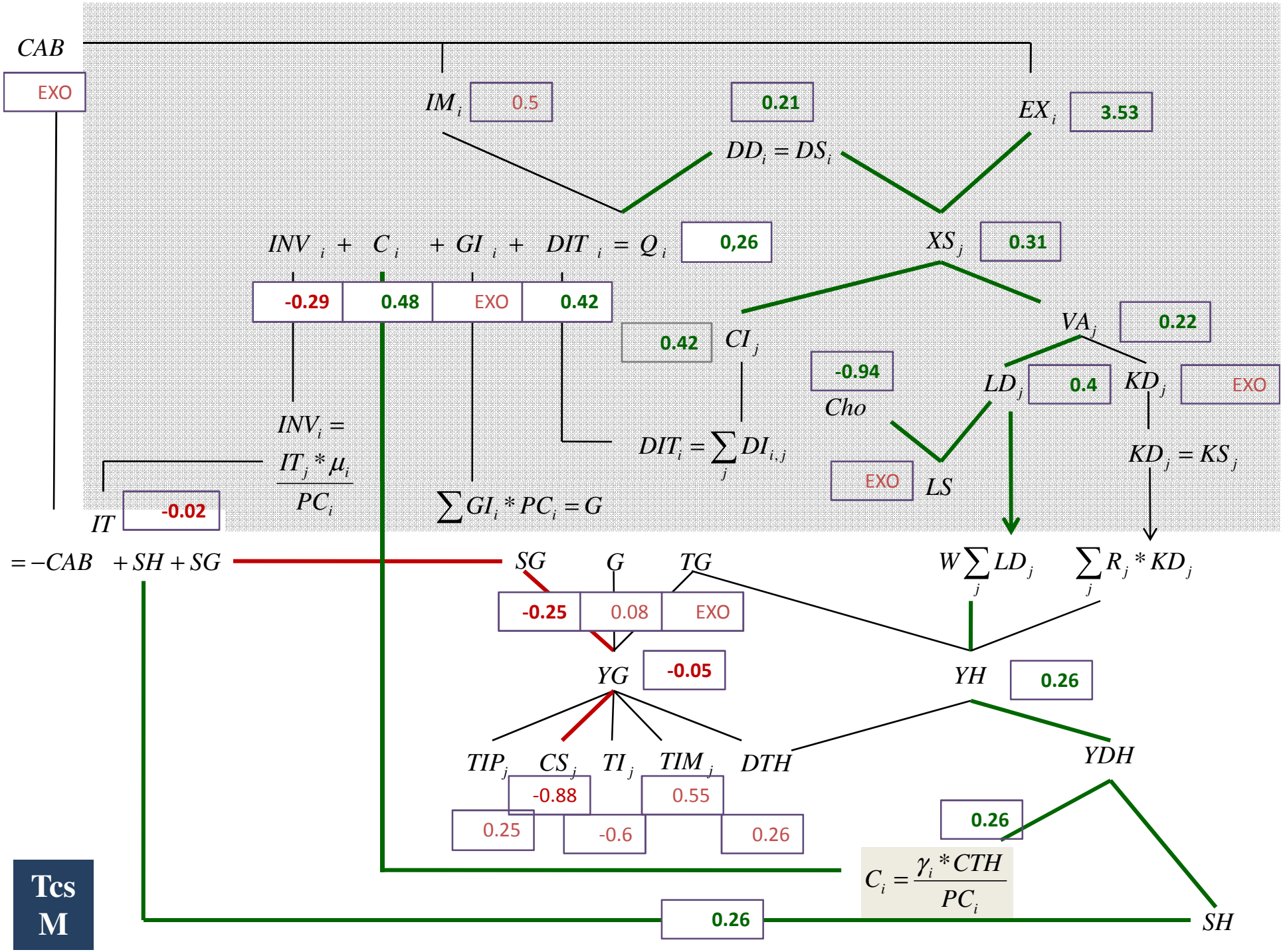
G
TG
$W\sum_j LD_j$
$\sum_j R_j * KD_j$
-0.25
0.08
EXO
YG
-0.05
YH
0.26
TIP_j
CS_j
TI_j
TIM_j
DTH
YDH
-0.88
0.55
0.25
-0.6
0.26
0.26
$C_i = \frac{\gamma_i * CTH}{PC_i}$
0.26
SH
Tcs
M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VA_j
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0.4
KD_j
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TI_j
TIM_j
DTH
YDH
-0.88
0.55
0.25
-0.6
0.26
0.26
$C_i = \frac{\gamma_i * CTH}{PC_i}$
0.26
SH
Tcs
M

Impacts on the tourist sector

variable	ST		
	Trb = 0	Tcs = 0	**Tx = 0**
XS	**2,09**	9,6	**3,53**
VA	**2,09**	9,6	**3,53**
LD	**3,03**	14,17	**5,15**
YH	**0,05**	0,26	**-0,04**
INV	**-1,53**	7,22	**-3,77**
C	**1,66**	7,52	**4,32**
DIT	**0,1**	0,65	**0,16**
Q	**1,47**	6,59	**3,84**
DD	**1,47**	6,59	**3,84**
EX	**3,92**	18,4	**2,59**
IM	-	-	-

- **Positif effects for the two policies**

- Impacts on tourist sector are more important during the exemption of TVA than tax on production:

Initial situation:
tbr('trs')=0.016
tx('trs')=0.052 :

Impacts on the tourist sector and agregate

variable	ST			M		
	Trb = 0	Tcs = 0	**Tx = 0**	**Tbr = 0**	Tcs = 0	**Tx = 0**
XS	**2,09**	9,6	**3,53**	**0,06**	0,31	**0,011**
VA	**2,09**	9,6	**3,53**	**0,04**	0,22	**-0,1**
LD	**3,03**	14,17	**5,15**	**0,07**	0,4	**-0,01**
YH	0,05	0,26	-0,04	**0,05**	0,26	**-0,04**
INV	**-1,53**	7,22	**-3,77**	**-0,11**	-0,29	**-0,5**
C	**1,66**	7,52	**4,32**	**0,11**	0,48	**0,19**
DIT	**0,1**	0,65	**0,16**	**0,08**	0,42	**0,04**
Q	**1,47**	6,59	**3,84**	**0,05**	0,26	**0,01**
DD	**1,47**	6,59	**3,84**	**0,03**	0,21	**-0,006**
EX	3,92	18,4	2,59	0,76	3,53	0,58
IM	-	-	-	0,11	0,5	0,08

Why this difference?

Tbr

Industries on tourism take advantage. This reduction is reflected in the production cost P.

$$P_j = PT_j \,.\, (1 + tbr_j)$$

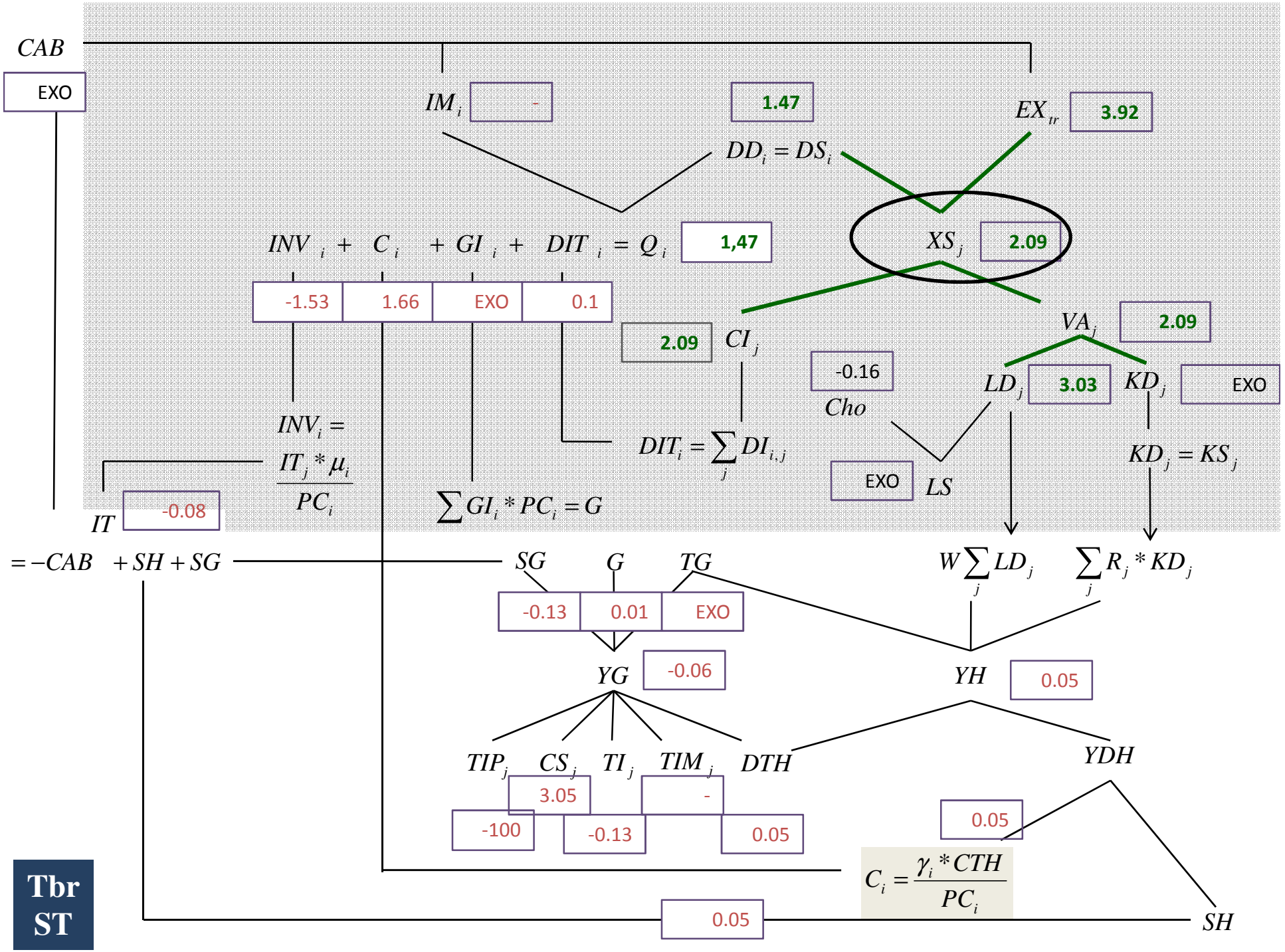
Tx

It's the consumption of tourist products which takes advantage. This reduction is reflected in the price PC

$$PD_i = (1 + tx_i)\, PL_i$$

$$PM_i = (1 + tx_i)(1 + tm_i)\,.\,e\,.\,PWM_i$$

Global effects ??


CAB
EXO
IM_i
-
1.47
$DD_i = DS_i$
EX_{tr}
3.92
$INV_i + C_i + GI_i + DIT_i = Q_i$
1,47
XS_j
2.09
-1.53
1.66
EXO
0.1
2.09
CI_j
VA_j
2.09
-0.16
Cho
LD_j
3.03
KD_j
EXO
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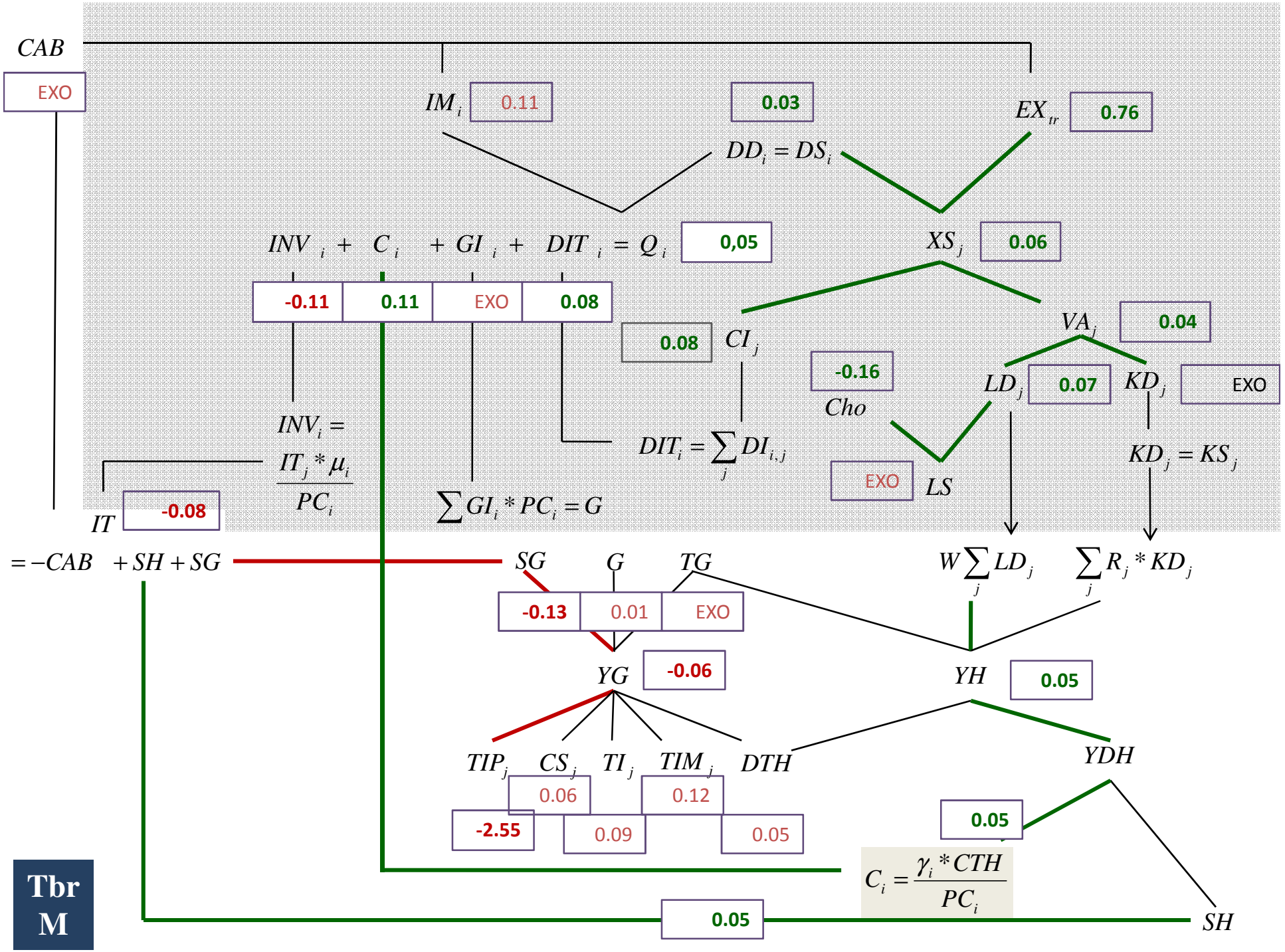
$KD_j = KS_j$
EXO
LS
IT
-0.08
$\sum GI_i * PC_i = G$
$= -CAB + SH + SG$
SG
G
TG
$W\sum_j LD_j$
$\sum_j R_j * KD_j$
-0.13
0.01
EXO
YG
-0.06
YH
0.05
TIP_j
CS_j
TI_j
TIM_j
DTH
YDH
3.05
-
-100
-0.13
0.05
0.05
$C_i = \frac{\gamma_i * CTH}{PC_i}$
0.05
SH
Tbr
ST


CAB
EXO
IM_i
0.11
0.03
$DD_i = DS_i$
EX_{tr}
0.76
$INV_i + C_i + GI_i + DIT_i = Q_i$
0,05
XS_j
0.06
-0.11
0.11
EXO
0.08
0.08
CI_j
VA_j
0.04
-0.16
Cho
LD_j
0.07
KD_j
EXO
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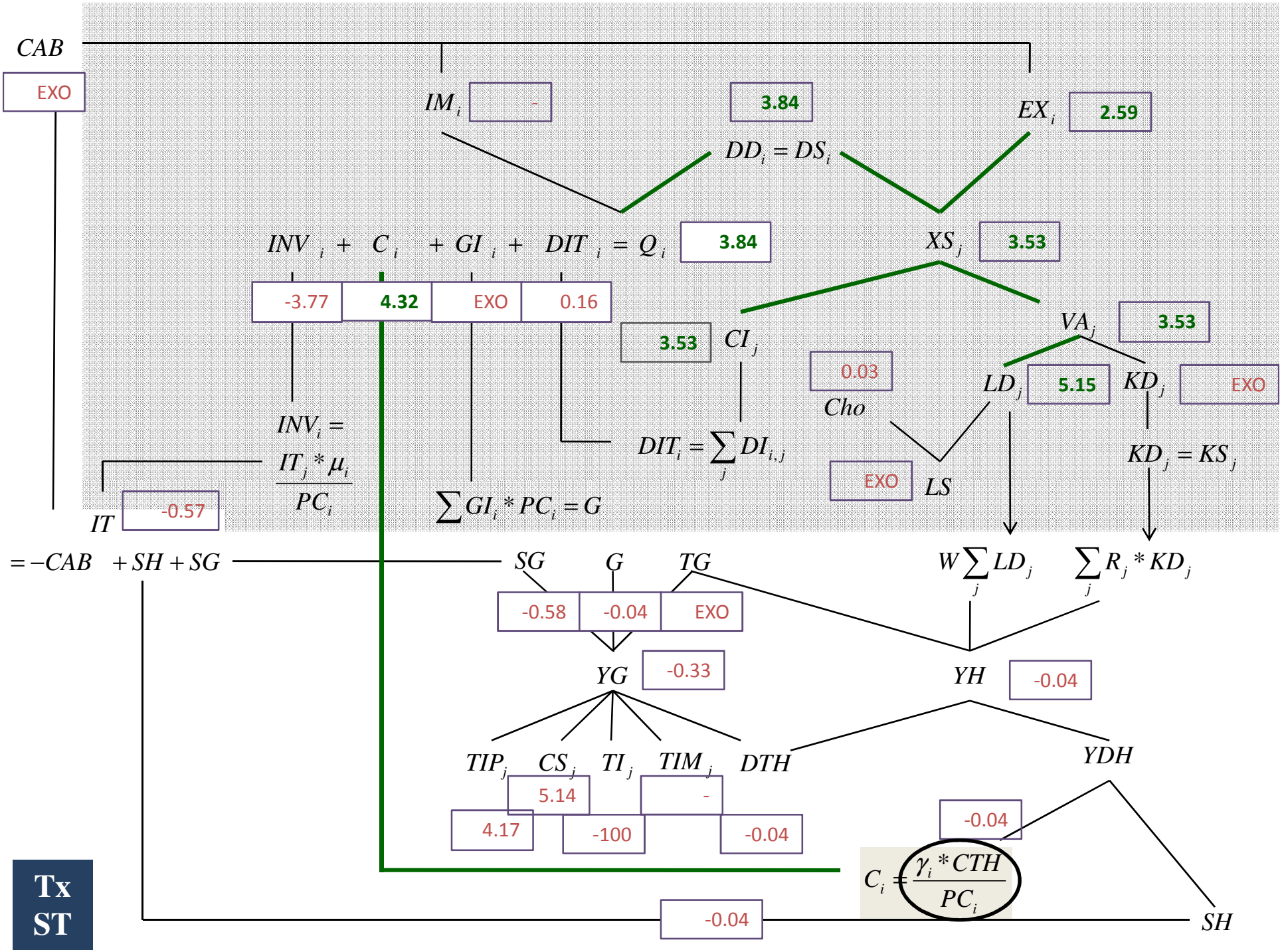
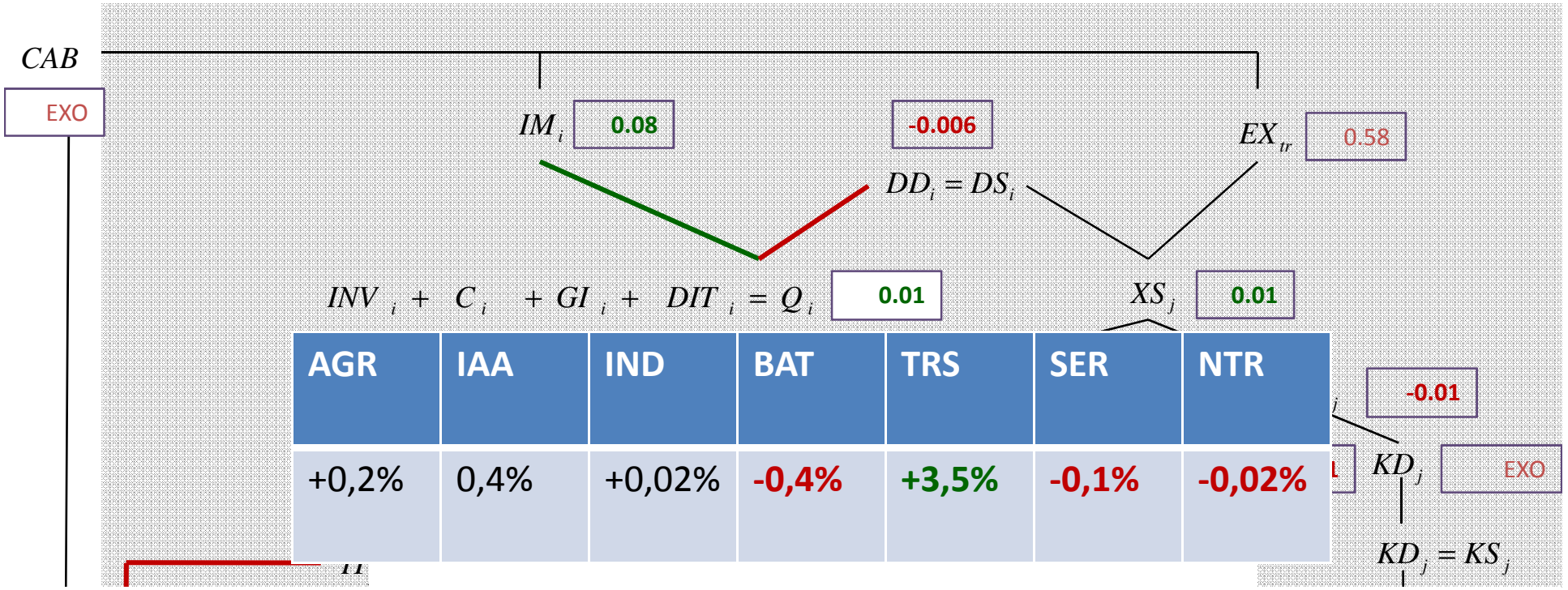
$DIT_i = \sum_j DI_{i,j}$
EXO
LS
$KD_j = KS_j$
IT
-0.08
$\sum GI_i * PC_i = G$
$= -CAB + SH + SG$
SG
G
TG
$W \sum_j LD_j$
$\sum_j R_j * KD_j$
-0.13
0.01
EXO
YG
-0.06
YH
0.05
TIP_j
CS_j
TI_j
TIM_j
DTH
YDH
0.06
0.12
-2.55
0.09
0.05
0.05
$C_i = \frac{\gamma_i * CTH}{PC_i}$
0.05
SH
Tbr
M


CAB
EXO
IM_i
-
3.84
$DD_i = DS_i$
EX_i
2.59
$INV_i + C_i + GI_i + DIT_i = Q_i$
3.84
XS_j
3.53
-3.77
4.32
EXO
0.16
3.53
CI_j
VA_j
3.53
0.03
Cho
LD_j
5.15
KD_j
EXO
$INV_i = \frac{IT_j * \mu_i}{PC_i}$
$DIT_i = \sum_j DI_{i,j}$
EXO
LS
$KD_j = KS_j$
IT
-0.57
$\sum GI_i * PC_i = G$
$= -CAB + SH + SG$
SG
G
TG
$W \sum_j LD_j$
$\sum_j R_j * KD_j$
-0.58
-0.04
EXO
YG
-0.33
YH
-0.04
TIP_j
CS_j
TI_j
TIM_j
DTH
YDH
5.14
-
4.17
-100
-0.04
-0.04
$C_i = \frac{\gamma_i * CTH}{PC_i}$
-0.04
SH
Tx
ST



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