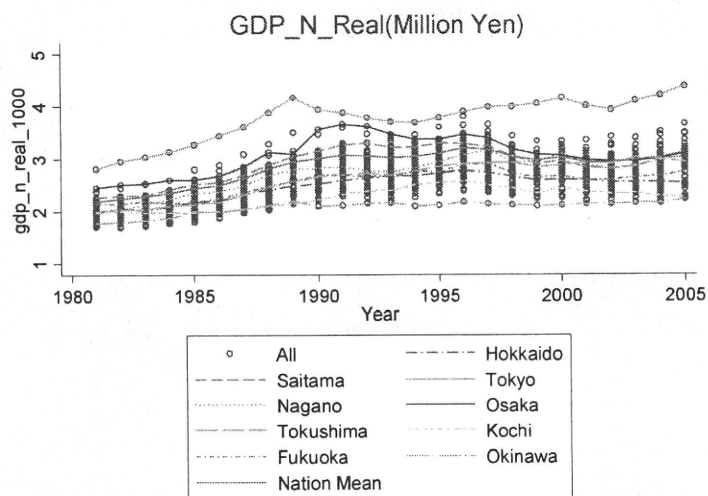


- Are there convergence of GDP, medical social capital, and medical cost?
- What is the speed of convergence and its sources.

31

Convergence of GDP per Capita (2000 real price)



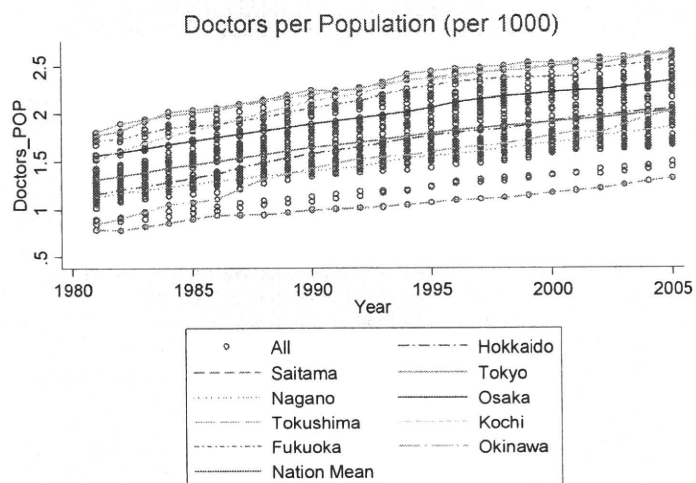
32

Convergence Aged Hospitalization Cost



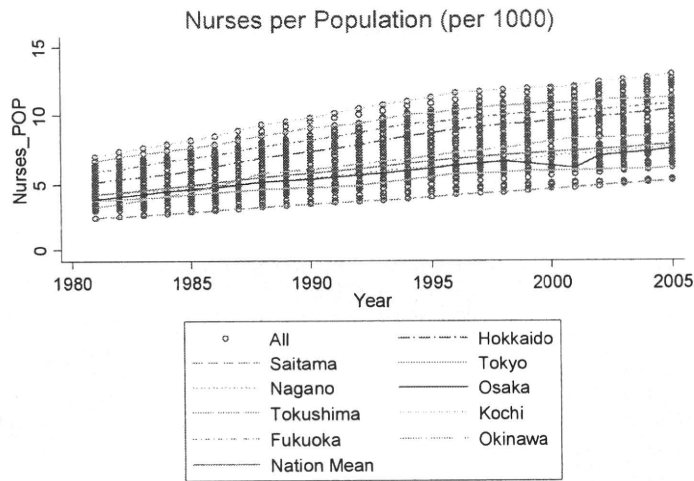
33

Doctors per 1000 population



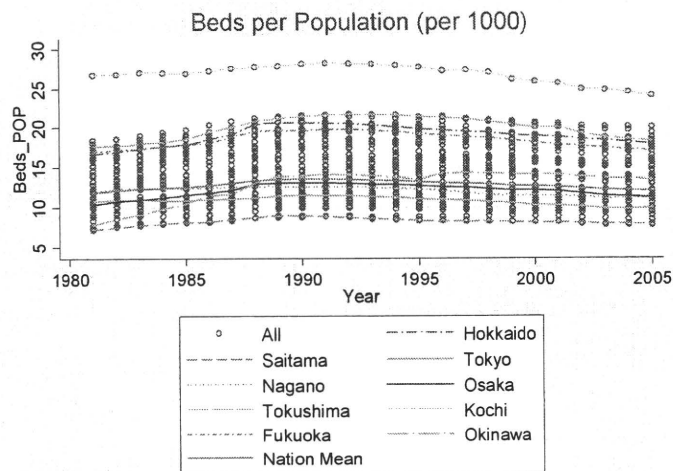
34

Nurses per 1000 Population



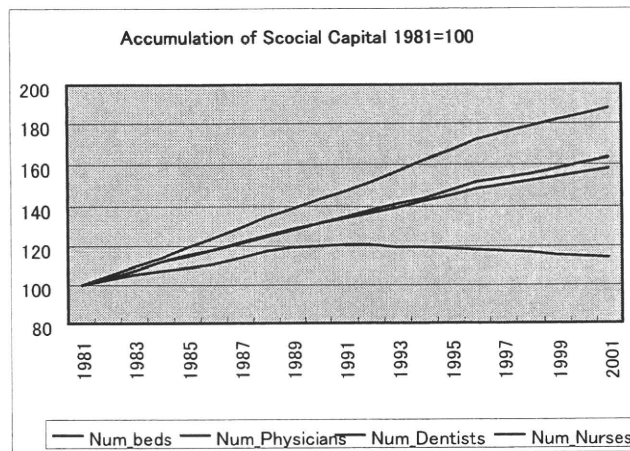
35

Beds per 1000 Population



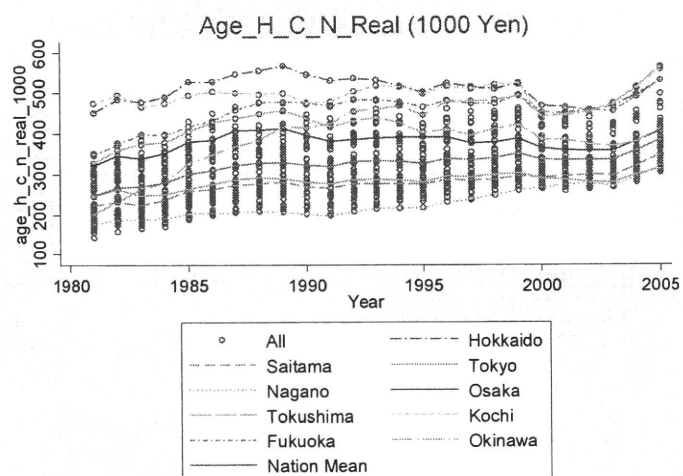
36

Social Capital of Medical Services



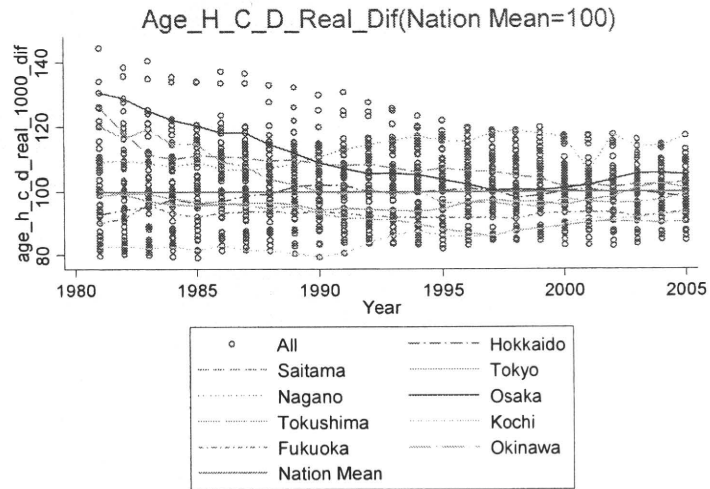
37

Variation of Aged Hospitalization (Medical Cost per Population: C/N)



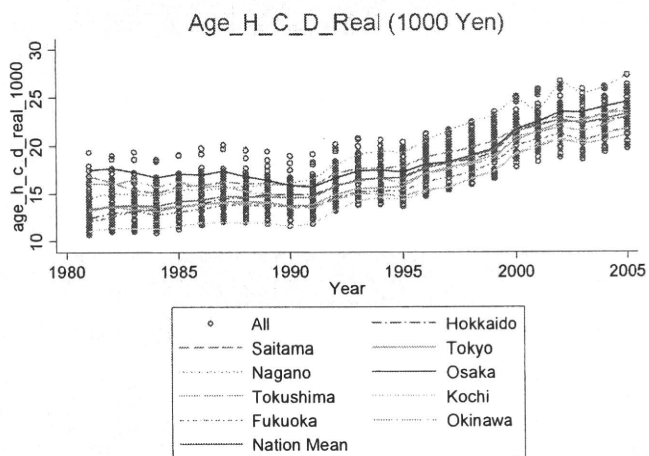
38

Variation of Aged Hospitalization (Medical Cost per Day: C/D)



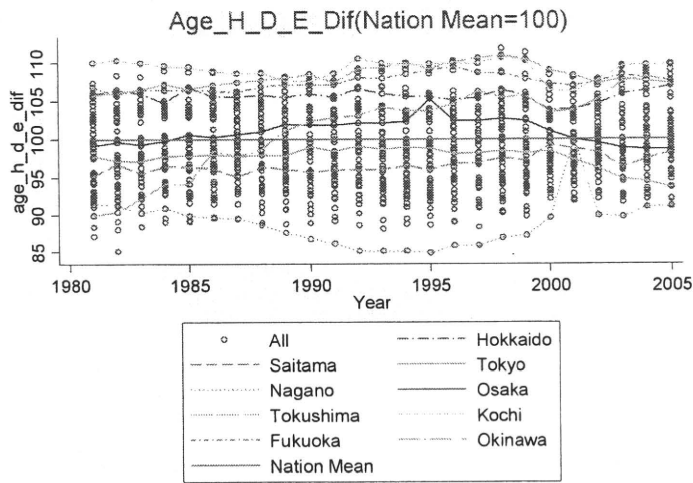
39

Variation of Aged Hospitalization (Medical Cost per Day: C/D)



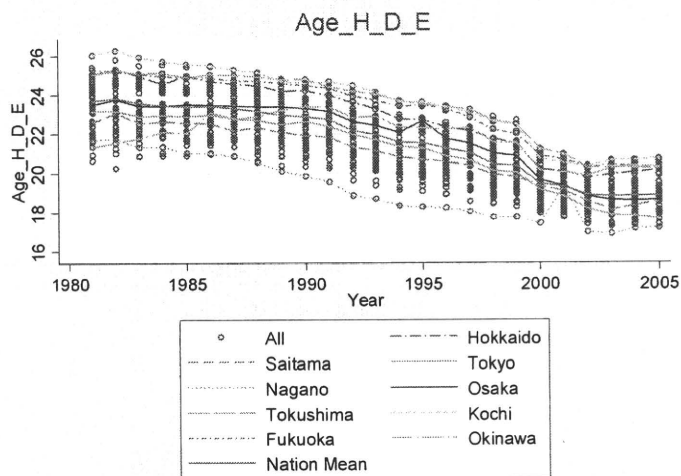
40

Variation of Aged Hospitalization (Days per Event: D/E)



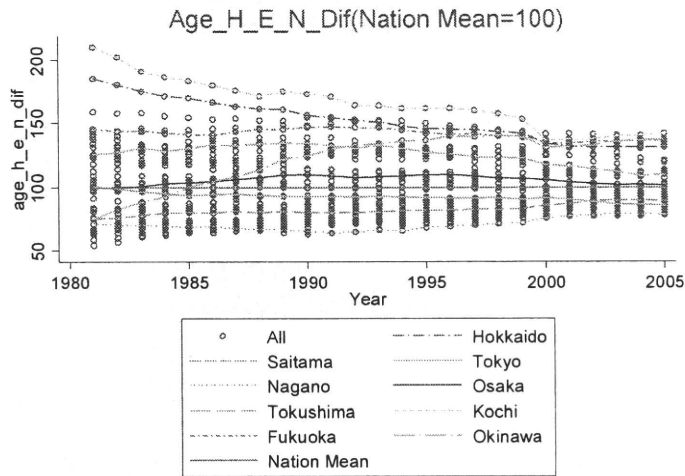
41

Variation of Aged Hospitalization (Days per Event: D/E)



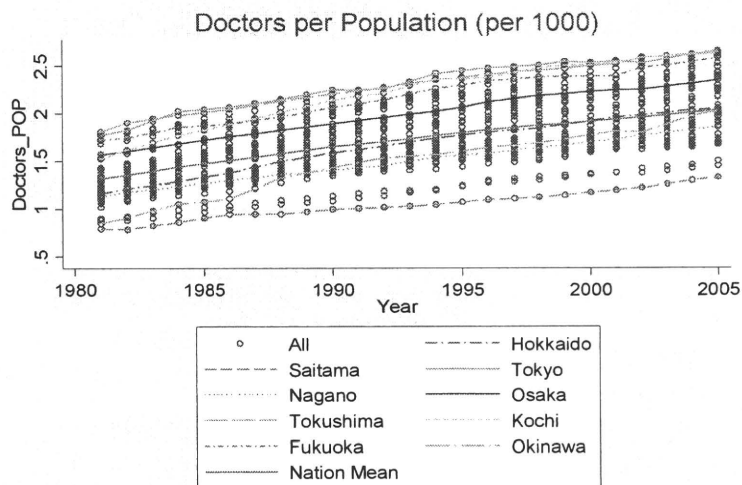
42

Variation of Aged Hospitalization (Events per Population : E/N)



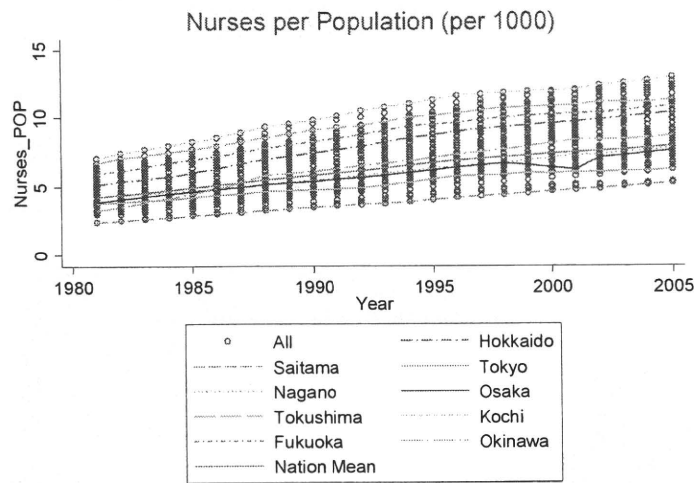
43

Figure 1-3. Doctors per Population (per 1000 Population)



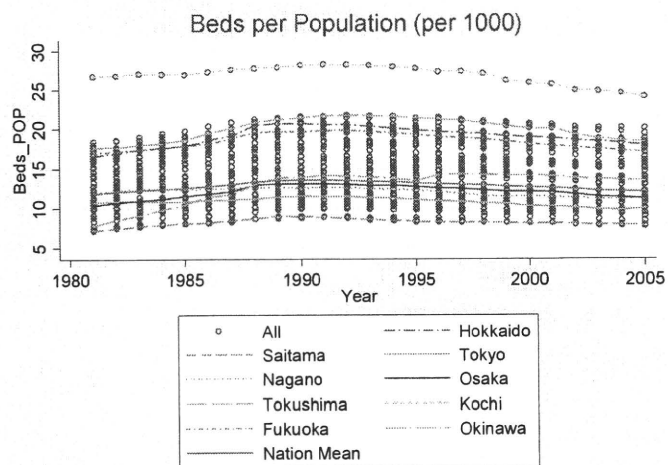
44

Figure 1-4 . Nurses per Population (per 1000 Population)



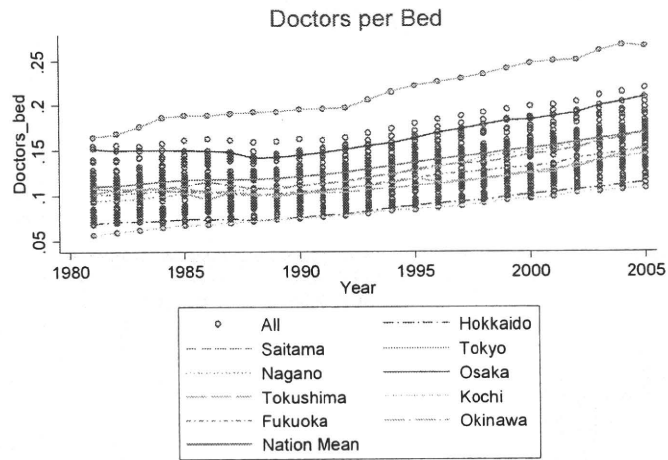
45

Figure 1-5. Beds per Population (per 1,000 Population)



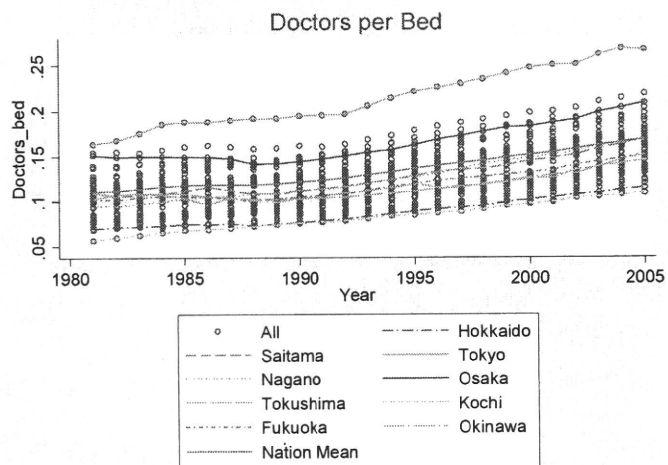
46

Figure 1-3. Doctors per Population (1000 Population)



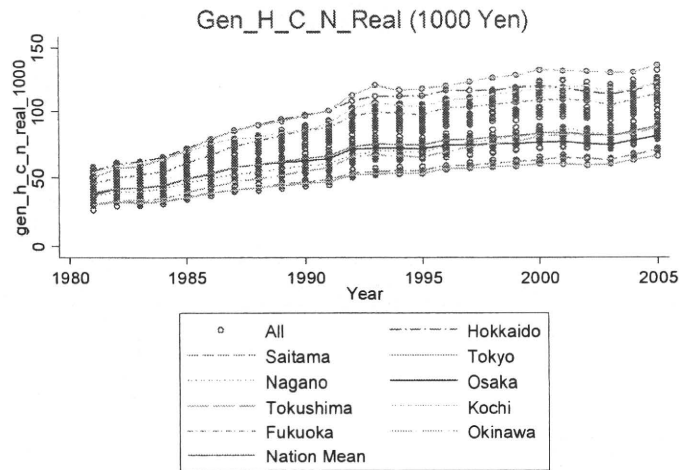
47

Figure 1-6. Doctors per Bed



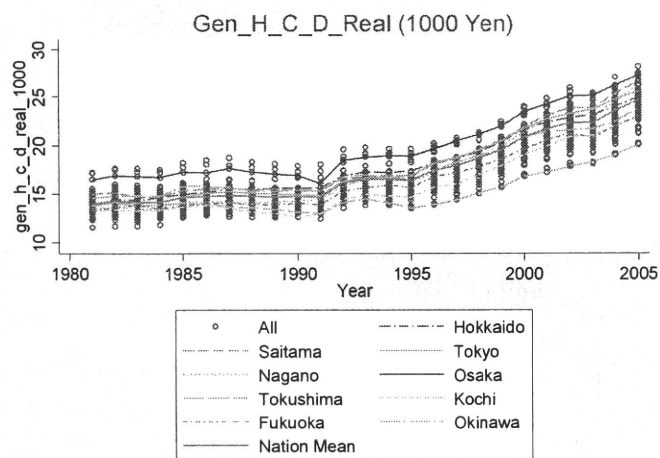
48

Figure 2-1 General Hospitalization Real Cost per Population (C/N)



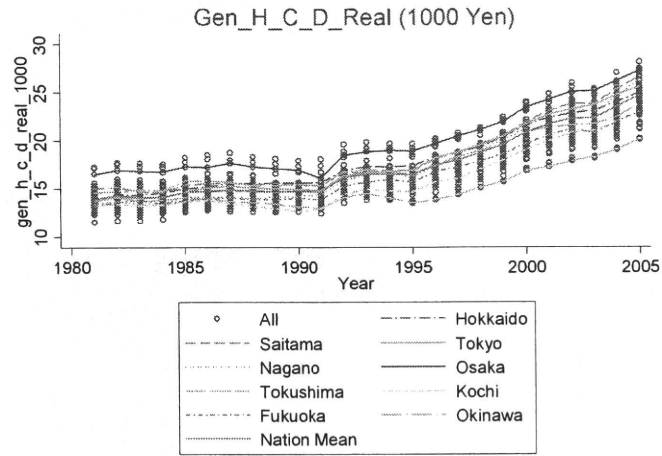
49

Figure 2-2. General Hospitalization Real Cost per Day (C/D)



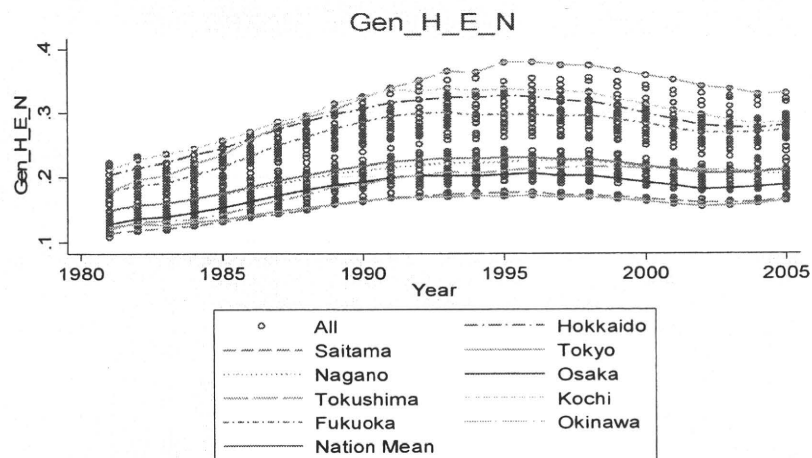
50

Figure 2-3. General Hospitalization Days per Event (D/E)



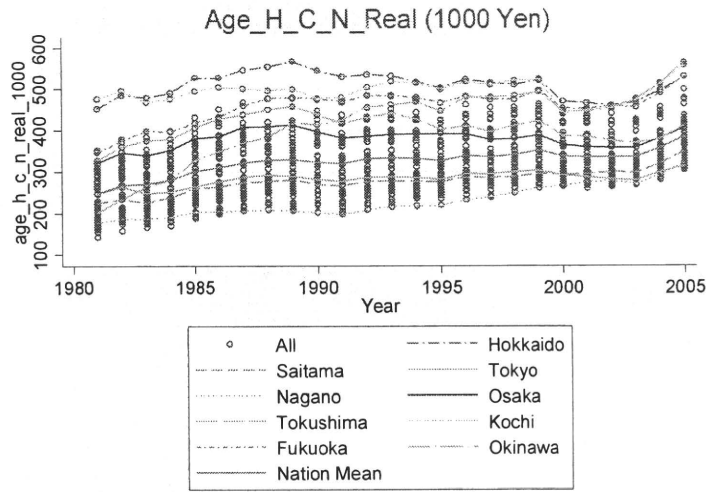
51

Figure 2-4. General Hospitalization Events per Population (E/N)



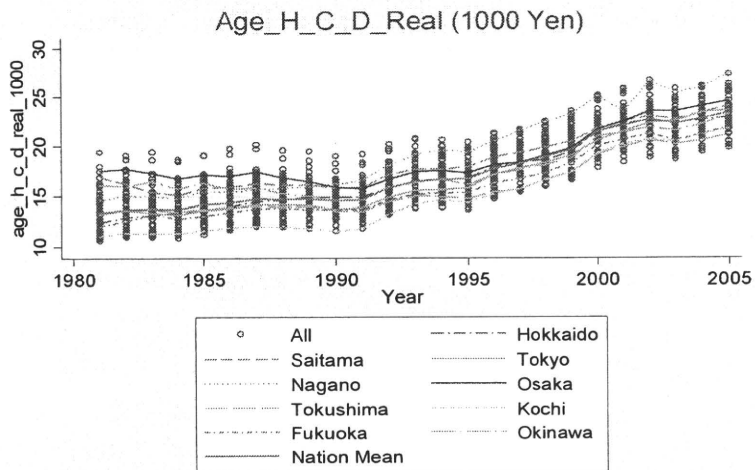
52

Figure 2-6 Aged Hospitalization Real Cost per Population (C/N)



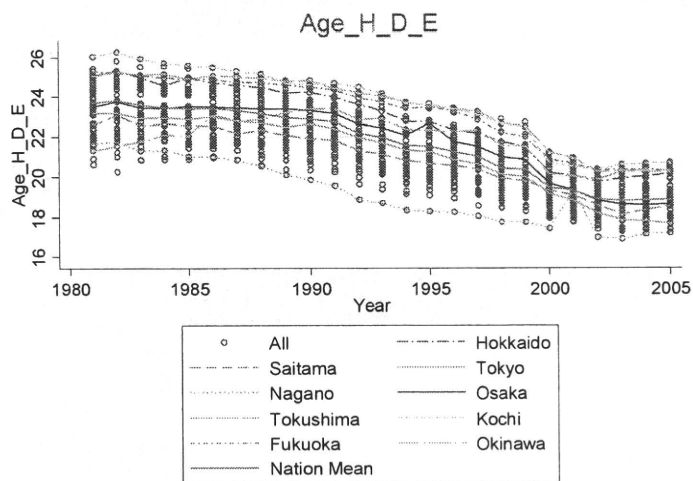
53

Figure 2-7. Aged Hospitalization Real Cost per Day (C/D)



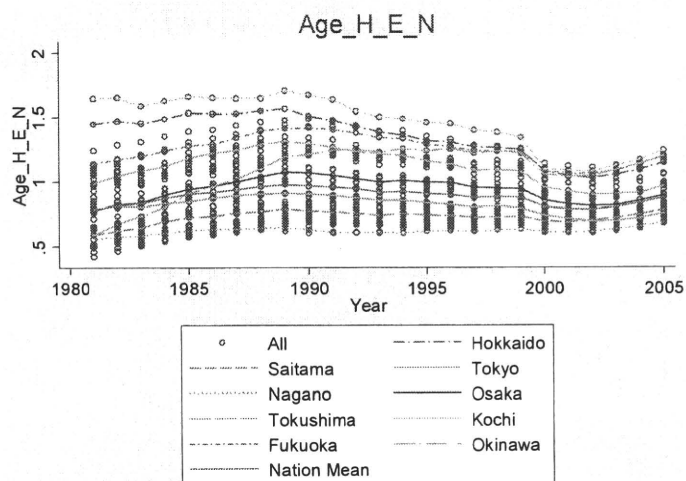
54

Figure 2-8. Aged Hospitalization Days per Event (D/E)



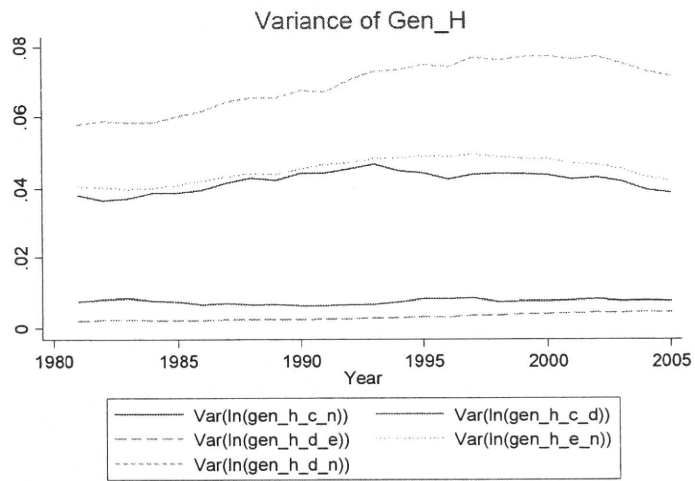
55

Figure 2-9. Aged Hospitalization Events per Population (E/N)



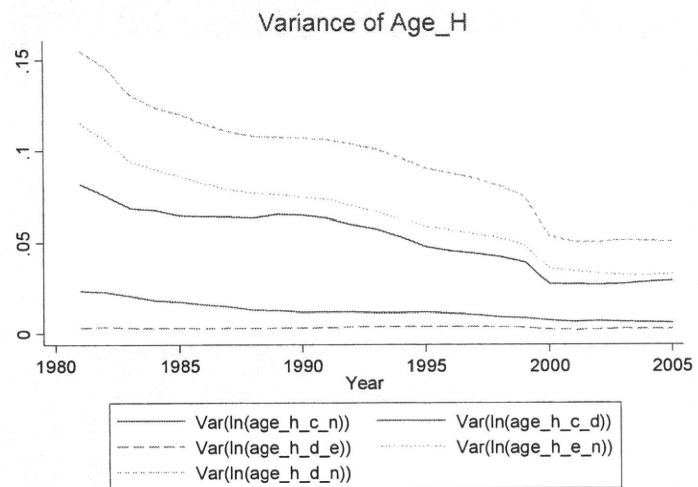
56

Figure 5-10. Variance of Natural Log Measures of the General Hospitalization



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Figure 5-13. Variance of Natural Log Measures of the Aged Hospitalization



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Method III. Decomposition of the Variance

$$Cov(\log z, \log x) = E(\log z \cdot \log x) - \overline{\log z} \cdot \overline{\log x}$$

$$Var(\ln c_{htsi}^N) = Cov(\ln c_{htsi}^N, \ln c_{htsi}^D) + Cov(\ln c_{htsi}^N, \ln d_{htsi}^E) + Cov(\ln c_{htsi}^N, \ln e_{htsi}^N)$$

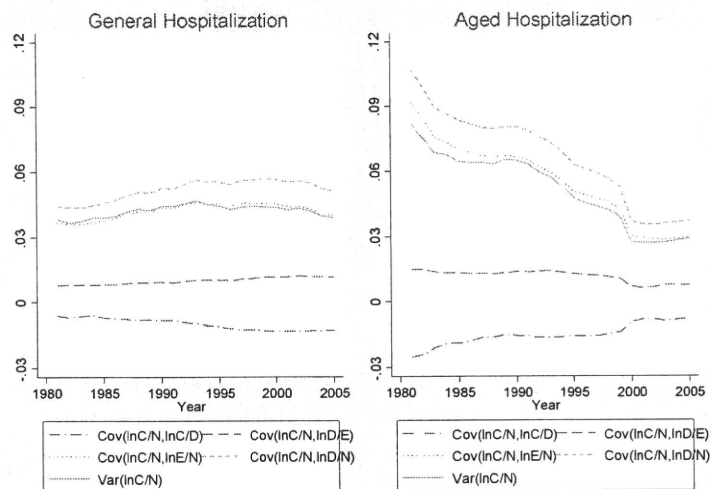
$$Var(\ln c_{htsi}^N) = Cov(\ln c_{htsi}^N, \ln c_{htsi}^D) + Cov(\ln c_{htsi}^N, \ln d_{htsi}^N)$$

$$1 = \frac{Cov(\ln c_{htsi}^N, \ln c_{htsi}^D)}{Var(\ln c_{htsi}^N)} + \frac{Cov(\ln c_{htsi}^N, \ln d_{htsi}^E)}{Var(\ln c_{htsi}^N)} + \frac{Cov(\ln c_{htsi}^N, \ln e_{htsi}^N)}{Var(\ln c_{htsi}^N)}$$

$$= b_1 (\ln c_{htsi}^N, \ln c_{htsi}^D) + b_2 (\ln c_{htsi}^N, \ln d_{htsi}^E) + b_3 (\ln c_{htsi}^N, \ln e_{htsi}^N)$$

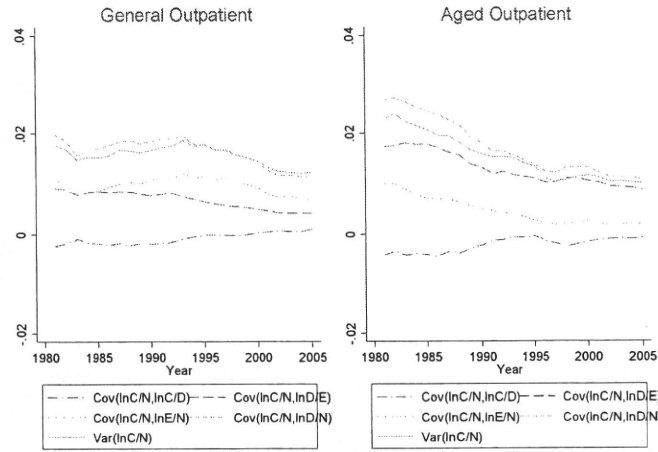
59

$$Var(\ln c_{htsi}^N) = Cov(\ln c_{htsi}^N, \ln c_{htsi}^D) + Cov(\ln c_{htsi}^N, \ln d_{htsi}^E) + Cov(\ln c_{htsi}^N, \ln e_{htsi}^N)$$



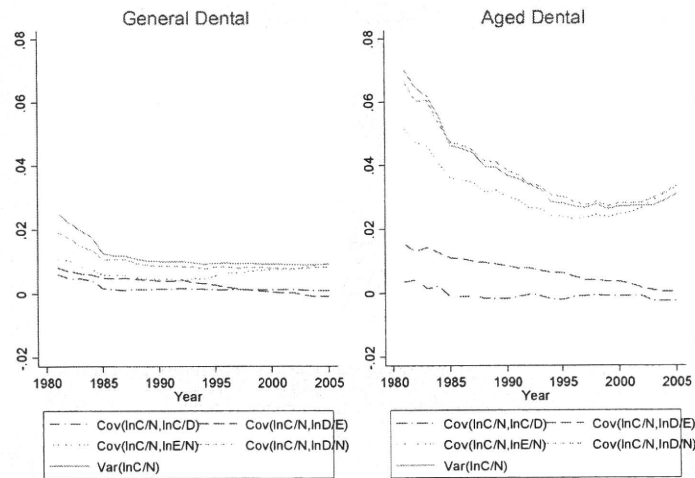
60

$$Var(\ln c_{htsi}^N) = Cov(\ln c_{htsi}^N, \ln c_{htsi}^D) + Cov(\ln c_{htsi}^N, \ln d_{htsi}^E) + Cov(\ln c_{htsi}^N, \ln e_{htsi}^N)$$



61

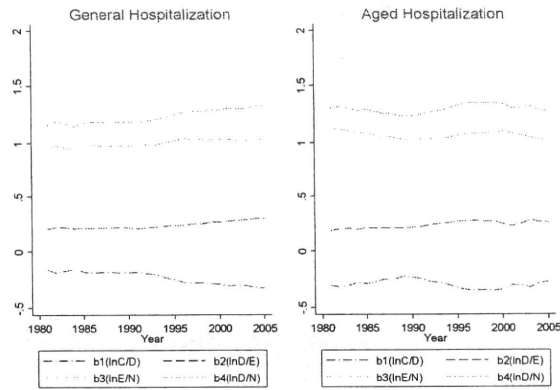
$$Var(\ln c_{htsi}^N) = Cov(\ln c_{htsi}^N, \ln c_{htsi}^D) + Cov(\ln c_{htsi}^N, \ln d_{htsi}^E) + Cov(\ln c_{htsi}^N, \ln e_{htsi}^N)$$



62

$$1 = \frac{\text{Cov}(\ln c_{hst}^N, \ln c_{hst}^D)}{\text{Var}(\ln c_{hst}^N)} + \frac{\text{Cov}(\ln c_{hst}^N, \ln d_{hst}^E)}{\text{Var}(\ln c_{hst}^N)} + \frac{\text{Cov}(\ln c_{hst}^N, \ln e_{hst}^N)}{\text{Var}(\ln c_{hst}^N)}$$

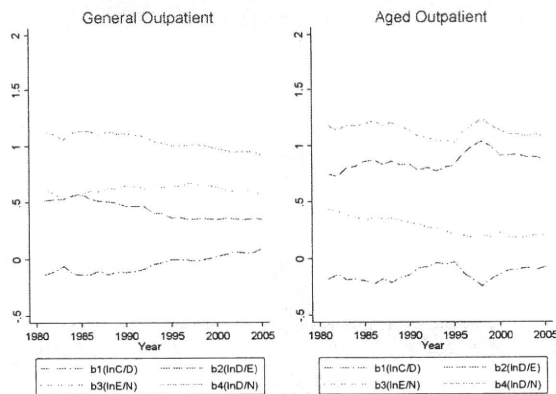
$$= b_1(\ln c_{hst}^N, \ln c_{hst}^D) + b_2(\ln c_{hst}^N, \ln d_{hst}^E) + b_3(\ln c_{hst}^N, \ln e_{hst}^N)$$



63

$$1 = \frac{\text{Cov}(\ln c_{hst}^N, \ln c_{hst}^D)}{\text{Var}(\ln c_{hst}^N)} + \frac{\text{Cov}(\ln c_{hst}^N, \ln d_{hst}^E)}{\text{Var}(\ln c_{hst}^N)} + \frac{\text{Cov}(\ln c_{hst}^N, \ln e_{hst}^N)}{\text{Var}(\ln c_{hst}^N)}$$

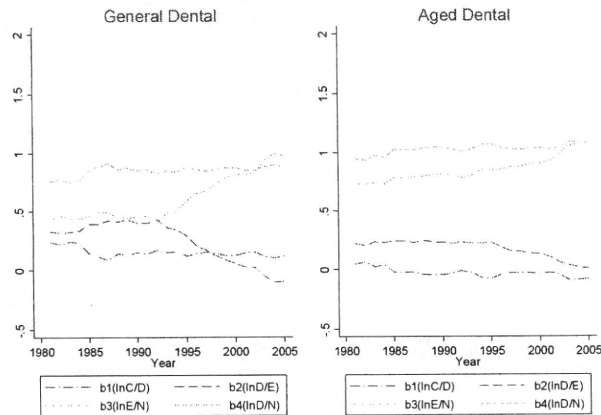
$$= b_1(\ln c_{hst}^N, \ln c_{hst}^D) + b_2(\ln c_{hst}^N, \ln d_{hst}^E) + b_3(\ln c_{hst}^N, \ln e_{hst}^N)$$



64

$$1 = \frac{\text{Cov}(\ln c_{hst}^N, \ln c_{hst}^D)}{\text{Var}(\ln c_{hst}^N)} + \frac{\text{Cov}(\ln c_{hst}^N, \ln d_{hst}^E)}{\text{Var}(\ln c_{hst}^N)} + \frac{\text{Cov}(\ln c_{hst}^N, \ln e_{hst}^N)}{\text{Var}(\ln c_{hst}^N)}$$

$$= b_1 (\ln c_{hst}^N, \ln c_{hst}^D) + b_2 (\ln c_{hst}^N, \ln d_{hst}^E) + b_3 (\ln c_{hst}^N, \ln e_{hst}^N)$$



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Variance Decomposition of C/N

Aged Hospitalization

Decline of $\text{Var}(C/N)$ is explained by
 $\text{Cov}(C/N, E/N)$

$\text{Cov}(C/N, C/D)$ was negative in the 1980s
 it has become less in magnitude the 1990s

Significant impact around year 2000

66

Variance Decomposition of C/N

Aged Hospitalization

Decline of $\text{Var}(C/N)$ is explained by
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$\text{Cov}(C/N, C/D)$ was negative in the 1980s
it has become less in the 1990s

Significant impact around year 2000

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Estimation

$$y_{ht} = \ln q_{ht} - \overline{(\ln q_t)}$$

$$y_{ht} = e^{-\delta_1} \cdot y_{ht-1} + \sum_i^K \beta_i X_{ht}^i + \sum_{j=1}^H \gamma_j D_j + \sum_{l=1}^M \tau_l T_l + u_{ht}$$

$$y_{ht} - y_{h,t-T} = e^{-\delta} \cdot (y_{ht-1} - y_{h,t-1-T}) + \sum_i^K \beta_i (X_{ht}^i - X_{h,t-1-T}^i) + \sum_{l=1}^M \tau_l T_l + (u_{ht} - u_{h,t-T})$$

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Estimation Results for the General Hospitalization

Dependent Variable	C/N	C/D	D/E	E/N
	Cost per Capita L _{gen_h_c_n_d_dif5}	Cost per Day L _{gen_h_c_d_d_dif5}	Days per Event L _{gen_h_d_e_d_dif5}	Event per Capita L _{gen_h_e_n_d_dif5}
Explanatory Variables				
Lag Dependent Var	0.60 *** (29.81)	0.63 *** (-31.73)	0.57 *** (19.05)	0.50 *** (24.12)
C/D(t)		-	-0.07 *** (-4.46)	-0.14 *** (-4.82)
D/E(t)		-0.21 *** (-6.77)		0.40 *** (8.75)
E/N(t)		-0.10 *** (-6.58)	0.08 *** (6.31)	
GDP	0.06 *** (2.81)	0.03 *** (2.99)	0.00 (-0.05)	0.04 *** (2.63)
Beds_Population	0.12 *** (5.24)	-0.004 (-0.31)	0.00 (-0.37)	0.13 *** (6.97)
Doctors_Population	-0.03 (-1.46)	-0.01 (-1.04)	0.00 (0.60)	-0.03 (-1.85)
Nurses per Population	0.17 *** (6.11)	0.04 *** (2.72)	0.02 (1.85)	0.12 (0.02)
Beds_Use_Rate	0.02 (0.44)	0.02 (0.72)	0.03 (-1.74)	0.06 (1.70)
Aged_Home Capacity	0.01 (0.94)	0.01 (1.29)	-0.01 *** (-2.35)	0.02 *** (2.76)
Observation	1,081	1,081	1,081	1,081
Root Mean Square Error	0.04	0.02	0.02	0.03

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Estimation Results for the Aged Hospitalization

Dependent Variable	C/N	C/D	D/E	E/N
	Cost per Capita L _{gen_h_c_n_d_dif5}	Cost per Day L _{gen_h_c_d_d_dif5}	Days per Event L _{gen_h_d_e_d_dif5}	Event per Capita L _{gen_h_e_n_d_dif5}
Explanatory Variables				
Lag Dependent Var	0.62 *** (28.68)	0.59 *** (27.03)	0.48 *** (18.01)	0.45 *** (19.55)
C/D(t)		-	-0.06 *** (-5.75)	-0.19 *** (-5.72)
D/E(t)		-0.36 *** (-6.88)		0.86 *** (10.69)
E/N(t)		-0.09 *** (-6.06)	0.08 *** (10.89)	
GDP	0.08 *** (3.06)	0.04 *** (2.27)	0.00 (0.16)	0.09 *** (3.47)
Beds_Population	0.18 *** (5.43)	-0.029 (-1.44)	0.04 (4.09)	0.12 *** (3.83)
Doctors_Population	0.00 (0.06)	0.02 (1.53)	0.00 (-0.26)	-0.01 (-0.27)
Nurses per Population	0.05 (1.29)	0.04 *** (1.96)	-0.01 (-1.13)	0.06 (1.93)
Beds_Use_Rate	0.26 (4.31)	-0.01 (-0.41)	0.03 (1.93)	0.24 (4.35)
Aged_Home Capacity	0.02 (1.80)	0.01 (1.00)	-0.03 *** (-7.64)	0.08 *** (6.65)
Observation	1,081	1,081	1,081	1,081
Root Mean Square Error	0.05	0.03	0.01	0.05

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