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Examining the Revealed Comparative Advantage of the ASEAN 6 Countries Using the Balassa Index and Lafay Index

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ABSTRACT

Using the Balassa Index and the Lafay Index, this paper examined the revealed comparative advantage of the first six ASEAN member nations for the period 2007-2011. Findings show that in the region, Brunei has the greatest comparative advantage in oil while Indonesia and Malaysia have an advantage in animal, vegetable fats and oils, cleavage products and similar products. The Philippines is advantageously placed in electrical and electronic equipment and Singapore has a distinct advantage in organic chemicals. Among all the ASEAN6 countries, only Thailand enjoys an advantage in vehicles other than railway, tramway. The paper also identified areas of cooperation or competition and proposed some general recommendations for each country.

Keywords: ASEAN, Balassa index, Lafay index, revealed comparative advantage

Ⅰ. Introduction

The integration of the ASEAN member nations into one economic community is set for 2015. As stated in the ASEAN Economic Community Blueprint, the move aims to raise the competitiveness of the region by turning ASEAN into one single market and production base with the free flow of goods, services, skilled labor, investment and capital. Part of this scheme is the elimination of tariffs on most goods as well as removal of non-tariff barriers in all member countries. Opening up borders to other nations could mean increased competition as well as greater economic efficiencies. It is thus important to know where the comparative advantage of each country lies so that instead of competing, each country can focus on what it is good at and maximize its economic potential.

This paper seeks to identify the sectors where the ASEAN member countries have a comparative advantage as well as the possible areas of competition and cooperation. It also aims to examine any changing pattern in their comparative advantage from 2007 to 2011. For purposes of this study, only the first six ASEAN member nations were analyzed, namely Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore and Thailand.

Ⅱ. Review of Literature

The concept of revealed comparative advantage was introduced by Balassa in 1965. It was proposed as an alternative to the classical Ricardian trade theory of comparative advantage based on factor endowments which often times can be cumbersome to measure (Le, 2010). Balassa postulates that a country's comparative advantage can also be observed using post-trade data which are relatively more accessible (Bender and Li, 2002). One limitations of the Balassa index is that it uses only export data. Thus, it is unable to capture intra-industry trade flows wherein a country's exports may have substantial import content. This weakness is addressed using the Lafay index which already incorporates imports (Alessandrini et al., 2007).

In 1995, Khalifah examined the revealed comparative advantage of ASEAN member countries from 1985-1990 using two other indices: the world-export share index and the export-import ratio. The indices were computed based on the 2-digit SITC Revision 2 data. It showed that Malaysia and Indonesia had a comparative advantage in primary products while the Philippines and Thailand possessed a comparative advantage in labor-intensive goods.

Another more recent study done by Le (2010) examined Vietnam's changing comparative advantage using the Balassa Index. It showed that even with the shift to technology-based manufacturing, the country's comparative advantage largely remained dependent on labor and natural resources which have relatively low value addition.

Ⅲ. Data and Methodology

The analysis for the revealed comparative advantage of each of the ASEAN6 nation was done using two indices, the Balassa Index and the Lafay Index for the two-digit level of Harmonized System (HS) classification with 98 sectors. The data can be accessed through the International Trade Center website. The Balassa Index (BI) is the most commonly used in assessing trade performance because of its relative simplicity. It is computed based on the following formula:

$$BIij = \frac{Xij/Xj}{Xiw/Xw}$$

where X is exports, j is the country under study, i refers to the specific industry and w is world exports. If the BIij>1, country j is said to have an export comparative advantage in industry i, since this Industry's share of export in country j is greater than its share in world exports. On the other hand, if BIij<1, it means that country j has no comparative advantage in industry i. The comparative advantage neutral point is when BIij = 1. As can be noted from the formula, the BI is limited to export data. It ignores imports, which are an important factor to consider in a country's overall trade performance, particularly for countries with extensive intra-industry trade.

To make up for the shortcoming of BI, the Lafay (1992) Index (LI) was also used in the analysis as it takes into account both exports and imports. The LI for country j and industry i is computed based on the formula:

$$LI_{ji} = K[(X_{ji}-M_{ji})-(X_j-M_j)*[(X_{ji}+M_{ji})/(X_j+M_j)]]$$

where X refers to export, M refers to imports and K is a constant equivalent to $1000/X_i+M_i$. Hence, aLI_{ji}>0 indicates that country i has a comparative advantage in industry j. Conversely, if the LI_{ji}<0, that country has a comparative disadvantage in the said industry. This might indicate substantial reliance on imports which does not contribute to a positive trade balance. The comparative advantage neutral point is when LI_{ji}=0 which means that the country both exports and imports nearly equal amounts of the said commodity.

Ⅳ. Results and Discussion

The tables presented show the sectors where each ASEAN6 country holds or has held a comparative

advantage from the period 2007 to 2011 using both the Balassa Index and Lafay Index.

4.1. Brunei Darussalam

Table 1 shows that Brunei Darussalam has an extensive revealed comparative advantage in sector 27

which includes mineral fuels, oils, distillation products and related commodities. In 2007, it was also advantageously placed in sector 61 (articles of apparel, accessories, knit or crochet). However, the country was not able to maintain it during the five-year period.

Table 1. Revealed Comparative Advantage of Brunei Darussalam, 2007-2011

Sector Code	BI					LI				
	2007	*2008*	*2009*	*2010*	*2011*	*2007*	*2008*	*2009*	*2010*	*2011*
27	**6.8**	**5.5**	**6.8**	**6.4**	**5.6**	**41**	**27**	**34**	**35**	**39**
61	1.9	0.9	0.89	0.1	0.08	1	0	0.7	0.1	0.1

Source: Adapted from the International Trade Center (2013).

Note: The sectors where the country enjoys revealed comparative advantage based on both indices have been highlighted.

4.2. Indonesia

The Balassa Index in Table 2 shows that Indonesia enjoyed a revealed comparative advantage in the world market in 30 sectors in 2007. However, when taking

into account the Lafay Index, its revealed comparative advantage was trimmed down to 13 sectors where it consistently had an LI greater than zero for the whole five-year period.

Table 2. Revealed Comparative Advantage of Indonesia, 2007-2011

Sector Code	BI					LI				
	2007	*2008*	*2009*	*2010*	*2011*	*2007*	*2008*	*2009*	*2010*	*2011*
03	**3.1**	**3.3**	**2.7**	**2.4**	**2.3**	**1**	**1**	**1**	**1**	**1**
09	4.8	5.3	4.5	3.8	2.9	0	1	1	0	0
13	2	1.3	-	1	0.8	0	0	-	0	0
15	**20.8**	**20.7**	**20.2**	**19.9**	**17.7**	**4**	**6**	**5**	**5**	**5**
16	1.4	1.5	1.7	1.5	1.5	0	0	0	0	0
18	4.3	4.7	4.5	4.3	2.8	0	0	1	0	0
23	1	1	0.5	0.6	0.7	-1	-1	-1	-1	0
24	1.8	1.8	1.9	2	1.6	0	0	0	0	0
25	1.1	0.7	0.8	0.4	0.3	0	0	0	0	0
26	**5.3**	**3.6**	**5.4**	**4.2**	**2.6**	**2**	**1**	**2**	**2**	**2**
27	**1.8**	**1.6**	**2**	**2**	**2**	**-2**	**3**	**4**	**5**	**5**
34	1.4	1.5	1.5	1.4	1.4	0	0	0	0	0
40	**5.6**	**5.9**	**4.4**	**4.5**	**5.6**	**2**	**2**	**2**	**2**	**3**
44	**3.1**	**3**	**2.9**	**2.7**	**2.5**	**1**	**1**	**1**	**1**	**1**
46	3	2	2	3	3	0	0	0	0	0
47	3.6	4.2	3.1	3.2	2.8	0	0	0	0	0
48	**2.5**	**2.5**	**2.4**	**2.5**	**2**	**1**	**1**	**1**	**1**	**1**
52	1.6	1.5	1.3	1.3	1	0	-1	-1	-1	-1
54	3.6	3.3	3.4	3	2.6	0	0	0	0	0
55	6.3	6.3	6.4	6.3	5.7	0	0	0	0	0
61	**1.7**	**1.7**	**1.7**	**1.6**	**1.5**	**1**	**1**	**1**	**1**	**1**
62	**2.4**	**2.2**	**2.2**	**2.1**	**1.9**	**1**	**1**	**1**	**1**	**1**
64	**2.4**	**2.5**	**2.3**	**2.6**	**2.5**	**1**	**1**	**1**	**1**	**1**
67	3.3	4.5	4	4.3	4	0	0	0	0	0
74	**2.2**	**1.8**	**2.4**	**2**	**1.8**	**1**	**0**	**1**	**1**	**1**
75	6.6	5.8	3.6	5.1	3.5	1	1	0	0	0
80	**22.8**	**36.3**	**36.3**	**27.5**	**24**	**0**	**1**	**1**	**1**	**1**
92	8.5	7.8	7.8	7.3	6.5	0	0	0	0	0
94	**1.5**	**1.4**	**1.3**	**1.2**	**0.9**	**1**	**1**	**1**	**1**	**0**
96	1.1	0.9	0.8	0.9	0.8	0	0	0	0	0

Source: Adapted from the International Trade Center (2013).

Note: The sectors where the country enjoys revealed comparative advantage based on both indices have been highlighted.

This is a strong indication that the country's trading edge in these sectors is relatively stable. Indonesia enjoys the greatest comparative advantage in sector 15, which is composed of animal, vegetable fats and oils, cleavage products and similar products. It is followed by sector 80 (tin and articles thereof and sector 40 rubber and articles thereof). By 2011 however, five sectors lost their comparative advantage. These are sectors 13 (lac, gums, resins, vegetable saps and extracts not elsewhere specified), 23 (residues, wastes of food industry, animal fodder), 25 (salt,

sulphur, earth, stone, plaster, lime and cement), 94 (furniture, lighting, signs, prefabricated buildings) and lastly, sector 96 (miscellaneous manufactured articles). Although sector 52 (cotton) continued to exhibit a revealed comparative advantage in the five-year period, its BI has been declining, and starting 2008 its LI has posted a negative value. Likewise, for sector 94, which includes furniture, lighting, signs, prefabricated buildings, Indonesia's comparative advantage was declining until it was lost in 2011.

4.3. Malaysia

As can be seen in Table 3, Malaysia's revealed comparative advantages are concentrated in six sectors, namely sector 15 (animal, vegetable fats and oils, cleavage products and similar products), sector 27 (mineral fuels, oils, distillation products and similar products), sector 40 (rubber and articles thereof), sector 44 (wood and articles of wood, wood charcoal), sector 84 (boilers, machinery, nuclear reactors and similar products) and sector 94 (furniture, lighting, signs, prefabricated buildings). Although Malaysia showed a

comparative advantage in sector 84, this was lost in 2011. Similarly, in sector 85 (electrical and electronic equipment), even if the BI shows a comparative advantage in the five-year period, its consistently negative LI shows heavy reliance on imports which places the country at a disadvantaged position. It is noteworthy though that in recent years, Malaysia has acquired some comparative advantages in two new industries, which include sector 21 (miscellaneous edible preparations), and sector 78 (lead and articles thereof).

Table 3. Revealed Comparative Advantage of Malaysia, 2007-2011

Sector Code	BI					LI				
	2007	*2008*	*2009*	*2010*	*2011*	*2007*	*2008*	*2009*	*2010*	*2011*
15	**14.3**	**15.1**	**14.7**	**15.7**	**16.7**	**3**	**4**	**3**	**3**	**3**
18	2.3	2.5	2.1	2.8	2.5	0	0	0	0	0
19	1	1.2	1.3	1.3	1.5	0	0	0	0	0
21	0.8	1	1	1.2	1.4	0	0	0	0	0
25	0.8	1	1.2	1	1	0	0	0	0	0
27	**1**	**1**	**1.1**	**1.1**	**1**	**3**	**4**	**3**	**3**	**3**
34	1.2	1.4	1.3	1.2	1.4	0	0	0	0	0
38	1.7	1.5	1.4	1.6	1.7	0	0	0	0	0
39	0.9	1	1	1	1	0	0	0	0	0
40	**3**	**3.3**	**3.2**	**3.7**	**3.6**	**1**	**1**	**1**	**1**	**1**
44	**3.1**	**3**	**3.4**	**3.2**	**3**	**1**	**1**	**1**	**1**	**1**
54	1.2	1.2	1.4	1.3	1.3	0	0	0	0	0
70	0.8	1.2	1.3	1.2	1.4	0	0	0	0	0
78	0.6	0.8	0.8	1	1.8	0	0	0	0	0
79	0.3	0.9	1.6	0.9	1.1	0	0	0	0	0
80	4.5	7.8	8	9.3	10.2	0	0	0	0	0
84	**1.4**	**1.3**	**1.4**	**1.3**	**1**	**2**	**1**	**1**	**1**	**-1**
85	2.3	1.3	2.2	2.1	2.2	-2	-4	-1	-2	0
94	**1.3**	**1.3**	**1.3**	**1.3**	**1.2**	**1**	**1**	**1**	**1**	**0**
99	0.3	2.6	0.1	0.1	0.1	0	2	0	0	0

Source: Adapted from the International Trade Center (2013).

Note: The sectors where the country enjoys revealed comparative advantage based on both indices have been highlighted.

4.4. Philippines

Table 4 shows that from 2007 to 2011, the Philippines consistently enjoyed revealed comparative advantages in seven sectors. These are as follows: sectors 8 (edible fruit, nuts, peel of citrus fruit, melons), 15 (animal, vegetable fats and oils, cleavage products and similar products), 44 (wood and articles of wood, wood charcoal), 61 (articles of apparel, accessories, knit or crochet), 62 (articles of apparel, accessories, not knit or crochet) 74 (copper and articles thereof) and 85 (electrical and electronic equipment). The country's greatest comparative advantage lies in sector 85 which comprises the bulk of its exports. It is also interesting to note that in 2011, the country has gained a comparative advantage in two industries, namely sector 89 (ships, boats and other floating structure) and sector 99, which consisted of commodities not elsewhere specified. However, in the same year, the country seemed to have lost its edge in sector 84 (boilers, machinery, nuclear reactors) as it posted a BI of less than one.

Table 4. Revealed Comparative Advantage of Philippines, 2007-2011

Sector Code	BI					LI				
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
03	1.2	1.4	1.3	1.2	1.5	0	0	0	0	0
08	**3.1**	**3.5**	**3**	**2.2**	**4.1**	**1**	**1**	**1**	**0**	**1**
13	4.7	6.7	5.5	7.7	8.3	0	0	0	0	0
15	**3.4**	**3.9**	**3**	**4.8**	**5**	**1**	**1**	**1**	**1**	**1**
16	1.6	2.9	3	2.5	2.5	0	0	0	0	0
17	1.2	1.4	1.6	0.7	3.3	0	0	0	0	0
20	2	2.2	2.6	2.1	2.9	0	0	0	0	0
24	1.3	1.8	2	2.4	3.1	0	0	0	0	0
26	2	1.4	1.5	1.4	1.6	0	0	0	0	0
28	1	0.8	1.1	1.2	1.5	0	0	0	0	0
42	1.1	1.1	0.9	0.8	0.5	0	0	0	0	0
44	**1.9**	**2.8**	**3.2**	**3**	**5.5**	**1**	**1**	**1**	**1**	**2**
46	6.5	5	5.5	9	11	0	0	0	0	0
53	1.3	2.5	1.5	1.5	2	0	0	0	0	0
61	**1.7**	**1.5**	**1.5**	**1.3**	**1.4**	**1**	**1**	**1**	**1**	**1**
62	**2**	**2**	**1.7**	**1.7**	**1.1**	**1**	**1**	**1**	**1**	**1**
67	1.3	2.5	1.7	1.7	2.7	0	0	0	0	0
74	**2.7**	**3.6**	**2.5**	**1.9**	**2.8**	**1**	**1**	**1**	**1**	**1**
80	0.8	1.5	1.3	1	1.6	0	0	0	0	0
84	1.7	1.6	1.9	1.8	0.9	4	3	4	4	1
85	**3.4**	**3.6**	**3.1**	**3.4**	**2**	**4**	**7**	**6**	**8**	**5**
89	0.1	0.2	0.9	0.7	1.3	0	0	0	0	1
99	-	-	-	-	6.2	-	-	-	-	3

Source: Adapted from the International Trade Center (2013).
Note: The sectors where the country enjoys revealed comparative advantage based on both indices have been highlighted.

4.5. Singapore

In 2007, the Balassa Index in Table 5 showed that Singapore enjoyed revealed comparative advantages in nine industries, although this is reduced to only four when the LI is taken into consideration. These four include sector 29 (organic chemicals), sector 39 (plastics and articles thereof), sector 85 (electrical and electronic equipment) and sector 99 (commodities not elsewhere specified). It is notable though that by 2011, the country acquired some comparative advantages in two new industries, namely sector 88 (aircraft, spacecraft, and parts thereof) and sector 89 (ships, boats and other floating structure). While the BI would show that Singapore has an edge in sector 27 (mineral fuels, oils, distillation products and similar commodities), its increasingly negative LI reveals a comparative disadvantage in this sector.

Table 5. Revealed Comparative Advantage of Singapore, 2007-2011

Sector Code	BI					LI				
	2007	*2008*	*2009*	*2010*	*2011*	*2007*	*2008*	*2009*	*2010*	*2011*
27	1	1.1	1.1	1.1	1.1	-3	-4	-4	-5	-6
29	**2**	**1.6**	**1.9**	**1.8**	**2.2**	**1**	**1**	**1**	**1**	**2**
33	1.2	1.2	1.3	1.6	1.9	0	0	0	0	0
38	1	1.1	1.2	1.1	1.1	0	0	0	0	0
39	**0.9**	**0.9**	**0.9**	**1.1**	**1.1**	**1**	**1**	**1**	**1**	**1**
49	1	1	0.9	1.3	1.8	0	0	0	0	0
75	0.4	0.7	0.9	1.1	0.7	0	0	0	0	0
78	1.4	1.5	0.5	0.5	0.5	0	0	0	0	0
80	6.3	6.8	7.3	4.8	5.8	0	0	0	0	0
82	1.1	1.1	1.1	1.1	1	0	0	0	0	0
84	1.3	1.4	1.4	1.3	1.2	0	1	0	0	0
85	**2.8**	**2.7**	**2.5**	**2.6**	**2.4**	**2**	**3**	**3**	**3**	**3**
88	0.8	0.9	1.5	1.5	1.5	-1	-1	-1	0	0
89	0.5	0.7	0.8	0.6	1.4	0	0	0	0	0
91	1.1	1.4	1.7	1.7	1.4	0	0	0	0	0
99	**1.4**	**1.7**	**1.1**	**1.3**	**2.3**	**2**	**2**	**2**	**2**	**3**

Source: Adapted from the International Trade Center (2013).
Note: The sectors where the country enjoys revealed comparative advantage based on both indices have been highlighted.

Table 6. Revealed Comparative Advantage of Thailand, 2007-2011

Sector Code	BI					LI				
	2007	*2008*	*2009*	*2010*	*2011*	*2007*	*2008*	*2009*	*2010*	*2011*
3	3.3	3.3	2.9	2.8	2.5	0	0	0	0	0
7	1.6	1.4	1.5	1.5	1.6	0	0	0	0	0
10	**4.6**	**5.6**	**5.7**	**5.2**	**4.7**	**1**	**2**	**2**	**1**	**1**
11	4.1	3.3	3.6	5.2	5.4	0	0	0	0	0
16	**12.3**	**13.5**	**13.1**	**12.8**	**13.2**	**1**	**2**	**2**	**2**	**2**
17	**4.3**	**4.9**	**5.1**	**4.4**	**6.1**	**0**	**0**	**1**	**1**	**1**
19	1.2	1.2	1.2	1.3	1.4	0	0	0	0	0
20	2.9	3.1	2.9	3	3	0	0	0	0	0
21	1.9	2.1	2.2	2.3	2.4	0	0	0	0	0
23	1.7	1.4	1.3	1.4	1.4	0	0	0	0	0
25	2.1	1.7	2.2	1.9	1.5	0	0	0	0	0
29	0.8	0.7	0.9	0.9	1.1	-1	0	0	0	0
33	1.1	1.2	1.2	1.5	1.4	0	0	0	0	0
34	0.8	2	1	1	1	0	0	0	0	0
35	2.1	2.2	1.9	2.1	2.3	0	0	0	0	0
39	**1.9**	**1.6**	**1.5**	**1.5**	**1.7**	**1**	**1**	**0**	**0**	**1**
40	**6.4**	**6.9**	**6.1**	**6.9**	**7.7**	**3**	**3**	**3**	**3**	**4**
41	1.2	1.4	1.4	1.2	1.2	0	0	0	0	0
49	1.7	2.7	2.9	3.7	6.3	0	0	0	0	1
54	1.4	1.5	1.5	1.6	1.4	0	0	0	0	0
55	3.2	3.1	3.5	3.5	3.4	0	0	0	0	0
56	1.5	1.5	1.6	1.4	1.3	0	0	0	0	0
57	1	1.1	1	1	0.9	0	0	0	0	0
58	1.1	1.2	1.4	1.4	1.4	0	0	0	0	0
61	1.1	1.1	1	0.9	0.8	1	1	1	0	0
64	1.1	1	0.8	0.7	0.6	0	0	0	0	0
67	1.3	1.5	1	0.7	0.7	0	0	0	0	0
69	2.1	2.1	1.3	1.2	1.2	0	0	0	0	0
71	1.7	2.1	2.5	2.2	1.7	0	0	1	0	-2
73	0.9	1	1.5	1.1	0.9	0	0	0	-1	-1
80	5	5	5.3	5.5	5	0	0	0	0	0
84	**1.5**	**1.4**	**1.4**	**1.5**	**1.3**	**3**	**3**	**2**	**2**	**1**
87	**1**	**1.2**	**1.2**	**1.4**	**1.1**	**3**	**3**	**2**	**3**	**2**
91	1.3	1.3	1	1	1	0	0	0	0	0

Source: Adapted from the International Trade Center (2013).
Note: The sectors where the country enjoys revealed comparative advantage based on both indices have been highlighted.

4.6. Thailand

From 2007 to 2011, Table 6 showed that Thailand's revealed comparative advantage is concentrated in seven sectors namely, sector 10 (cereals), 16 (meat, fish and seafood preparations not elsewhere specified), 17 (sugars and sugar confectionery), 39 (plastics and articles thereof), 40 (rubber and articles thereof), 84 (boilers, machinery, nuclear reactors and similar commodities) and finally, sector 87 (vehicles other than railway, tramway). In 2011, it gained some comparative advantages in sector 29 (organic chemicals). However, starting 2010, the country lost its comparative advantage in sector 61 (articles of apparel, accessories, knit or crochet).

Ⅴ. Areas of Cooperation or Competition

From the tables presented, it can be seen that in the ASEAN6, while some member countries share a comparative advantage in a common sector, there are those that enjoy an exclusive comparative advantage in a specific sector. Still others are comparatively disadvantaged in some sectors. This shows possible areas of competition as well as cooperation.

5.1. Areas of Cooperation

In the ASEAN6 region, only the Philippines has a comparative advantage inedible fruit, nuts, peels of citrus fruit, and melons while the country is quite disadvantaged when it comes to cereals. On the other hand, only Thailand has a comparative advantage in cereals in the region. It might therefore be more cost-effective for the Philippines to focus on edible fruits and to just import cereals from Thailand and for Thailand to concentrate on cereals and get its edible fruits from the Philippines. Indonesia, on the other hand, is the only country in the region that has a comparative advantage in paper and paper boat, articles of pulp, paper and board. Thus it will do well to continue specializing in this sector and supply the

needs of other ASEAN countries in this. For vehicles other than railway and tramway, Thailand is the only country that has managed to enjoy a comparative advantage. Thailand should further develop it not only for its considerable contribution to the country but as the region's potential player in this sector.

5.2. Areas of Competition

Since the ASEAN6 member nations all belong to the Asian continent it is not surprising that some countries share similar factor endowments and thus enjoy comparative advantage in a common sector. While all these countries can specialize in that sector, the country which has the greatest comparative advantage might be the most efficient and may undermine the other countries' comparative advantage once the economic integration is in place. For instance, in animal, vegetable fats and oils, cleavage products, etc. three countries share a comparative advantage in this sector. Indonesia is the most advantaged with an average BI = 19.86 and an average LI = 5 for the five year period. It is closely followed by Malaysia. The Philippines is at a far third with an average BI of 5 and an average LI of 1.

Another area of possible competition is mineral fuels, oils, distillation products, etc. where Brunei is most advantageously placed followed by Indonesia and Malaysia. Although Singapore has consistently registered a BI > 1, its LI has also been consistently and increasingly negative, implying that this sector does not contribute to a positive trade balance. This is evidenced by a negative net trade in this sector from 2008-2011. Thus, Singapore might want to reconsider whether it wants to continue specializing in this sector. One sector where Singapore is most advantageously placed in the region is in organic chemicals. However, in 2011, Thailand gained some comparative advantages in this area in 2011, although it might be still too early to tell if it can sustain this. On the other hand, Thailand has consistently enjoyed a comparative advantage in plastics and articles thereof where Singa-

pore was similarly advantageously placed particularly in 2010 and 2011.

Three countries are advantageously placed in rubber and articles thereof. Thailand enjoys the highest comparative advantage closely followed by Indonesia and then Malaysia. In wood and articles of wood, wood charcoal, Malaysia, Indonesia and the Philippines were all advantageously placed from 2007-2011, but in 2011 there was a marked increase in the comparative advantage of the Philippines. Three other areas where Indonesia and the Philippines share comparative advantages are in articles of apparel, accessories, knit or crochet; in articles of apparel, accessories, not knit or crochet; and in copper and articles thereof.

From 2007 to 2010, Malaysia, Thailand and the Philippines were all advantageously placed in boilers, machinery, nuclear reactors, etc. However, it was only Thailand that was able to sustain this advantage until 2011. In electrical and electronic equipment, the Philippines and Singapore have consistently shared a comparative advantage in this sector. While Malaysia also consistently registered a BI greater than 1, its LI has been negative from 2007 to 2010, although this improved to 0 by 2011, indicating a possibility of gaining a better comparative advantage. Singapore and the Philippines both gained some comparative advantages in ships, boats and other floating structure in 2011. This sector represents a considerable value addition and both countries will do well if they can sustain this advantage. For commodities not elsewhere classified, Singapore has been enjoying a comparative advantage in this sector since 2007, while the Philippines gained an advantage in this sector only in 2011. It would be interesting to know in which specific commodities Singapore and the Philippines have a comparative advantage.

VI. Conclusion and General Recommendations

With the aid of the Balassa Index and Lafay Index, the ASEAN6 member nations' comparative advantages in world trade were identified and analyzed. While Brunei has a distinct advantage in oil, it is almost solely dependent on this sector for its export income. It would profit the country in the long run if it can develop a comparative advantage in other sectors. Indonesia has the most sectors with a revealed comparative advantage, among them is oil. Its volume of trade is higher than Brunei's but it registered a lower LI, which might suggest that it should look closer at the import content in this sector. Malaysia could still work on the electrical and electronic equipment sector in order to improve its comparative advantage. The Philippines' greatest comparative advantage is in electrical and electronic equipment. But in terms of trade volume, it is lower than Malaysia and Singapore. Thus, the country should try to see how this sector's performance can be further maximized. Because of a consistently negative LI, Singapore should review its trade in oil. Finally, Thailand should try to maintain its comparative advantage in all sectors where it has a comparative advantage with a particular focus on vehicles other than railways and tramways.

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Appendices

Harmonized System at the 2-digit level

Code Description

01   Live animals

02   Meat and edible meat offal

03   Fish, crustacean, molluscs, aquatic invertebrates n.e.s*

04   Dairy products, eggs, honey, edible animal products

05   Products of animal origin, n.e.s

06   Live trees, plants, bulbs, roots, cut flowers etc

07   Edible vegetables and certain roots and tubers

08   Edible fruit, nuts, peel of citrus fruit, melons

09   Coffee, tea, mate and spices

10   Cereals

11   Milling products, malt, starches, inulin, wheat gluten

12   Oil seed, oleagic fruits, grain, seed, fruits, etc, n.e.s

13   Lac, gums, resins, vegetable saps and extracts n.e.s

14   Vegetable plaiting materials, vegetables products n.e.s

15   Animal, vegetable fats and oils, cleavage products, etc

16   Meat, fish and seafood preparations n.e.s

17   Sugars and sugar confectionery

18   Cocoa and coco preparation

19   Cereal, flour, starch, milk preparations and products

20   Vegetable, fruit, nut, etc food preparations

21   Miscellaneous edible preparations

22   Beverages, spirits and vinegar

23   Residues, wastes of food industry, animal fodder

24   Tobacco and manufactured tobacco substitutes

25   Salt, sulphur, earth, stone, plaster, lime and cement

26   Ores, slag and ash

27   Mineral fuels, oils, distillation products, etc

28   Inorganic chemicals, precious metal compound, isotopes

29   Organic chemicals

30   Pharmaceutical products

31   Fertilizers

32   Tanning, dyeing extracts, tannins, derivs, pigments etc

33   Essential oils perfumes, cosmetics, toiletries

34   Soaps, lubricants, waxes, candles, modeling pastes

35   Albuminoids, modified starches, glues, enzymes

36   Explosives, pyrotechnics, matches, pyrophoricsetc.

37   Photographic or cinematographic goods

38   Miscellaneous chemical products

39   Plastics and articles thereof

40   Rubber and articles thereof

41   Raw hides and skins (other than furskins) and leather

42   Articles of leather, animal gut, harness, travel goods

43   Fur skins and artificial furs, manufactures thereof

44   Wood and articles of wood, wood charcoal

45   Cork and articles of cork

46   Manufactures of plaiting material, basketwork etc

47   Pulp of wood, fibrous cellulosic material, waste etc

48   Paper and paper boat, articles of pulp, paper and board

49   Printed books, newspapers, pictures etc

50   Silk

51   Wool, animal hair, horsehair yarn and fabric thereof

52   Cotton

53   Vegetable textile fibresn.e.s, paper yarn, woven fabric

54   Manmade filaments

55   Manmade staple fibres

56   Wadding, felt, nonwovens, yarns, twine, cordage, etc

57   Carpets and other textile floor coverings

58   Special woven or tufted fabric, lace, tapestry etc

59   Impregnated, coated or laminated textile fabric

60   Knitted or crocheted fabric

61   Articles of apparel, accessories, knit or crochet

62   Articles of apparel, accessories, not knit or crochet

63   Other made textile articles, sets, worn clothing etc

64   Footwear, gaiters and the like, parts thereof

65   Headgear and parts thereof

66   Umbrellas, walking-sticks, seat-sticks, whips, etc

67   Bird skin, feathers, artificial flowers, human hair

68   Stone, plaster, cement, asbestos, mica etc articles

69   Ceramic products

70	Glass and glassware	86	Railway, tramway locomotives, rolling stock, equipment
71	Pearls, precious stones, metals, coins, etc	87	Vehicles other than railway, tramway
72	Iron and steel	88	Aircraft, spacecraft, and parts thereof
73	Articles of iron or steel	89	Ships, boats and other floating structure
74	Copper and articles thereof	90	Optical, photo, technical, medical etc apparatus
75	Nickel and articles thereof	91	Clocks and watches and parts thereof
76	Aluminum and articles thereof	92	Musical instruments, parts and accessories
78	Lead and articles thereof	93	Arms and ammunition, parts and accessories thereof
79	Zinc and articles thereof	94	Furniture, lighting, signs, prefabricated buildings
80	Tin and articles thereof	95	Toys, games, sports requisites
81	Other base metal, cermets and articles thereof	96	Miscellaneous manufactured articles
82	Tools, implements, cutlery, etc of base metal	97	Works of art, collector pieces and antiques
83	Miscellaneous articles of base metal	99	Commodities not elsewhere specified
84	Boilers, machinery, nuclear reactors, etc		
85	Electrical and Electronic equipment		

* not elsewhere specified

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Education and Income Inequality in China

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ABSTRACT

This paper studies the dynamic evolution of returns to human and physical capital and their effects on income equality in China. We employ a Markov switching OLG model to capture the dynamic interactions of education policies, financial constraints and income distribution. We find that increasing basic education levels across the country and relaxing financial constraints can reduce the income Gini coefficient. Due to different accumulation mechanisms for human and physical capital, both urban and rural income Gini coefficients display an inverted U-shape. Improving basic education and loosening borrowing constraints in rural areas can effectively speed up arrival of the Kucinici turning point and accelerate rural population migration. We also find these policies to be more effective during periods in which returns to human capital are high; furthermore, high marginal returns to education tend to worsen a country's income Gini coefficient.

Keywords: basic education, borrowing constraints, income gap, Kucinici turning point

Ⅰ. Introduction

China's economic reforms have had an unprecedented influence on Chinese urban and rural economies. China's annual GDP growth has averaged better than 9% over the past 30 years, creating a "growth miracle." However, the income gap between urban and rural areas has not diminished; this apparent dual economic structure has influenced nearly every aspect of China's recent economic growth. It is obviously interesting to study this income inequality in the context of the unique characteristics of China's economic system–namely, its urban and rural dichotomy, the differential stages of education and financial development in these two areas, and the mutual interaction between urban and rural parties in a dynamic setting.

In this paper we employ a Markov switching OLG model to analyze the allocation of educational resources to urban and rural areas. The roles of urban and rural financial development on China's income gap are also considered. We focus on how this financial dualism facilitates long-term changes in China's income gap and rural population migration. In particular, we concentrate on the interaction between financial inequality, educational inequality and income inequality.

The main contributions of this paper are as follows:

a. Modeling a dual economic structure using the OLG (overlapping generations) model. The Chinese

economy is modeled using two mutually interacting economic sectors: urban and rural. While these sectors are characterized by substantial differences in production technology, education and endowment of financial resources, they are linked by population migration and investment in physical capital. This framework enables us to examine the long-term dynamic processes of urban, rural and national income.

b. Integration of the mutual interaction between financial and educational markets. Our model not only examines the effect of financial and educational markets on residents' income but also incorporates into its analytical framework financial constraints on individuals' investments in education.

c. The choices of human and physical capital are endogenized to the rational choice of the microindividual. This allows us to analyze the dynamic change in the relative magnitude of returns to human and physical capital at different stages of the economy's development. We may proceed to analyze long-term dynamic changes in labor wages and asset income and their impacts on the income gap among residents.

The dual nature of China's economic structure can be summarized by the following three facts regarding the unbalanced nature of China's growth: inequality of per capita income, allocation of educational resources, and development of financial markets in urban and rural areas.

1.1. The Rising Urban-Rural Income Gap Drives a Gradual Widening of the Overall Chinese Income Gap

China's rapid economic growth since 1990 has widened its income gap and increased the Gini coefficient. Although scholars differ in their opinion of the exact measure of the Gini coefficient, the fact that China's income gap is expanding is indisputable. Fig. 1 shows that China's national income Gini coefficient rose from 0.302 in 1978 to 0.4624 in 2006 (Li, 1999, 2003; Kanbur & Zhang 2005; Chen et al., 2010). A great deal of research indicates that the broadening of the income gap between urban and rural areas is the major contributing factor for the increase in China's

overall income gap, which has risen as much as 50% (Chen et al., 2010). The ratio of urban individual income to rural individual income has increased from 2.35 in 1978 to 3.33 in 2006 (Li et al., 2008); simultaneously, the income distribution in both urban areas and the countryside has also worsened. In urban areas, the Gini coefficient increased from 0.1600 to 0.3360 from 1978 to 2006. During the same period, the Gini coefficient in rural areas grew from 0.2124 to 0.3737 (Chen et al., 2010).

Fig. 1. China's Overall Income Gini Coefficient and the Urban-Rural Income Ratio (1978-2006)
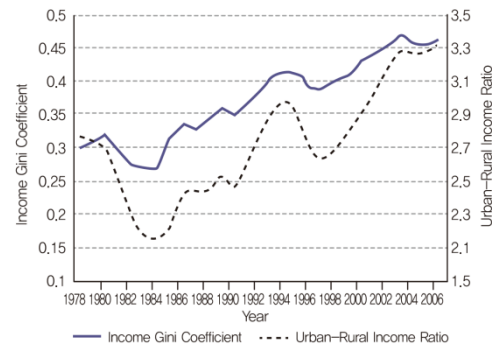
1.2. Imbalance in Educational Resource Allocation between Urban and Rural Areas

China's rapid economic growth has been accompanied by a marked increase in the overall level of education of the country at large. Data from the State Statistics Bureau indicate that between 1990 and 2007, the rate of primary school students going on to attend middle school increased from 74.6% to 99.9%. The rate at which middle school students go on to high school increased from 40.6% to 79.3%; the rate of high school graduates attending college increased even more dramatically, from 27.3% to 71.8%. National education expenditures rose from 54.87 billion Yuan in 1990 to 981.53 billion Yuan in 2006. However, policies favoring urban areas created an uneven allocation of educational resources between cities and the countryside. Since 2000, educational expenditures

per urban primary school student have been more than twice the per-student spending levels in rural areas (China's National Bureau of Statistics, 2006). In 2002, China's countryside, accounting for 60% of the country's population, received only 23% of that year's national education spending (Chen, 2004). Compared to urban areas, low rural incomes have led to relatively smaller amounts of rural private education spending. Coupled with long-term inadequacy in government spending, this has led directly to deficiencies in rural human capital. Since 1964, the illiteracy rate in rural areas has been approximately 1.8 times higher than in urban areas (Zhang & Kanbur, 2005). In 2000, the average number of years of education completed by urban laborers was 12.2; rural workers were only at 7.8. In 2008, the percentage of adults in rural areas with 9 or more years of education was only 32%, while in urban households, 76% of adults had received more than 9 years of education (World Bank, 2009). In 2005, the number of middle school students per 10,000 urban residents was more than 1.7 times a similar Fig. for rural areas, and the percentage of city students enrolled in high school was 12.3 times that of the countryside. In 1990, the college enrollment rate for urban residents was 2.9 times that of rural residents; the same ratio rose to 9.8 in 2003 (Cai, 2002; China's National Bureau of Statistics, 2006).

1.3. Imbalance in the Development of Financial Markets in Urban and Rural Areas

The uneven financial development between China's rural and urban areas is evident. The structure of financial organizations, the capacity for financial innovation, and the variety of financial services have always been incomplete in rural areas and, as a result, they are not on par with finance in urban areas (Zhang, 2003). China's financial dualism and development strategy of prioritizing urban areas facilitate simultaneous urban financial deepening and rural financial repression (Wen et al., 2005). Financial exclusion is noticeably higher in rural than in urban areas (Tian, 2011). Although in recent years the Chinese govern-

ment has formally made available a large number of low-interest loans to rural financial markets, currently over 60% of the financing channels available to rural families are informal, and most are zero-interest (Li & Li, 2004; Zhu & Liu, 2009). In 2002, the savings rate among rural residents was 0.31; over the same period, the national savings rate was 0.8. Also, in 2002, the rural financial system's financial credit rate was 0.28, while the nationwide financial credit rate stood at 1.22 (Wen et al., 2005). From 1994 to 2004, loans to rural residents, who comprise roughly two-thirds of the country's population, accounted for only 4-5% of nationwide loans. Chinese farmers acting as net lenders –the vast majority of the population – provided a financial surplus to other economic sectors (McKinnon, 1993).

The rest of the paper is organized as follows. Chapter 2 is a summary of the relevant literature. Chapter 3 establishes the main analytical model. Chapter 4 contains the results of the mathematical simulation. Chapter 5 contains main conclusions and policy descriptions. We leave technical derivations to the appendices.

Ⅱ. Literature Review

Research related to China's income gap has gathered more and more attention as the problem has worsened in recent years (Li et al, 2004, 2008; Kanbur & Zhang, 2005; Wan & Zhang, 2006). These scholars attribute the broadening of the income gap to many factors, including economic development, income distribution policy, and economic institutions. However, an increasing number of scholars posit that as China's economy develops, the urban-rural education gap exacerbates the urban-rural income gap and the income gaps found within urban and rural areas themselves.

In China, the income gap between urban and rural areas is an extremely important factor affecting the country's overall Gini coefficient, while the education gap is a dominating factor affecting the urban-rural

income gap. Furthermore, the trend is worsening (Zhang & Kanbur, 2005; Wang & Gong, 2009; Chen et al, 2010). Chen Binkai et al. (2010) believe the disparity in the level of education in urban and rural areas is responsible for 34.69% of the income gap between China's urban and rural areas, with urban-biased education policy being the deciding factor in the widening of the education and income gaps in urban and rural areas. Chen (2010) states that if the same amount of money per student were spent in cities and the countryside, the income gap between urban and rural residents would roughly halve. The World Bank (2009) claims that the income gap between cities and the countryside stems mainly from the difference in the labor productivity of urban and rural workers. In 2004, labor productivity per urban worker was 3.3 times that of rural workers. The World Bank states that the gap in human capital endowment created by the disparity in education is a critical factor for the emergence of a labor productivity gap between workers in cities and the countryside.

In rural areas, the increasing share of nonagricultural income plays a central role in income inequality within rural areas. Education level is the primary factor determining whether rural workers are able to find relatively high-paying nonagricultural jobs, although gaps in nonagricultural income exacerbate the rise in the Gini coefficient of rural China. In 1988, educated rural workers were about 10 percent more likely to obtain nonagricultural work than illiterate workers; by 1995, the same probability had risen to 20 percent (De et al., 2002; Li, 2003; Zhou, 2009).

In urban regions, property income is still low, so wages remain the primary source of income. Therefore, the wage gap is the key determinant of income disparity in urban areas. To a large extent, this gap arises from differences in education levels. China's reform has expanded employment in the emerging private sector and promoted formation of a competitive labor market. Wage disparities among varyingly skilled workers and groups with assorted levels of experience (caused by unequal education) have been on the rise. Data from a 2003 survey by the National

Bureau of Statistics show that education (45.6%) is the primary item responsible for wage disparity, followed by location (30.2%), experience (16.8%) and gender (7.0%).

In analyzing the determinants of income disparity, many believe education is a long-term, sustained influence. Mincer (1958) was the first to confirm the effect of education and training on income disparity. Becker (1978) believed that the amount of property children inherit from their parents and investment in children's education determine future earnings. Bound and Johnson (1992) claim that differences in education were the main reason for increases in income disparity during the 1980s. Fernández and Rogerson (1998) performed an empirical analysis to show that education equality can lead to an increase in residents' income and welfare. Gregorio and Lee (2002) used data for 100 countries from 1960 through 1990 to conclude that the growth in educational inequality has exacerbated income disparity, and that increasing the average level of education will help close the gap. The OLG model of Viaene and Zilcha (2002) provided a quantitative analysis of the mechanism by which education affects income inequality and economic growth.

Another line of research has confirmed that financial development also has a profound impact on income disparity due to constraints on individual human capital investment in education. Financial development affects the overall income gap via both individual labor income and financial (property-related) income (Demirgüç-Kunta & Levine, 2009). First, with regard to labor income, financial development restricts options for human resources and individual education. The ability of young individuals to obtain student loans from financial markets has extensive effects on future earnings in the job market (Chen, 2005). However, results of empirical analyses of financial development and income inequality by Chinese and foreign scholars tend to differ greatly due to differences in methodologies and sample data. Becker and Tomes (1979) showed how financial constraints influence individual labor income disparity by affecting individuals' options for investment in human capital. Galor and Zeira (1993)

and Galor and Moav (2003) studied how individuals' human capital choices continue to influence wage inequality and long-term economic development through the nonlinear (hyperbolic) accumulation of human capital under financial market frictions and uneven wealth endowments. Second, on the matter of financial income, Greenwood and Jovanovic (1990), Townsend and Ueda (2006), and Jeong and Townsend (2008) use dynamic models to discuss the influence of investment opportunities on financial development, explain the impact of financial deepening on income distribution and its dynamic evolution, and demonstrate that the relationship between financial development and the income gap adheres to a Kuznets curve. Banerjee and Newman (1998) analyze the relationship between finance and the income gap from the perspective of how development of financial markets affects individuals' choice of occupation and the distribution of wealth.

On one hand, many scholars in China believe overall financial development widens the gap in resident incomes (Wen et al., 2005; Yang et al., 2006; Jiang & Xu, 2007; Kai & Hamori, 2009). On the other hand, there are also many scholars who believe the contrary; financial development narrows this income gap (Clarke et al., 2002; Beck et al., 2004, 2007).

However, we think the above research exhibits two major shortcomings:

a. Chinese research is centered mainly on empirical analysis and lacks a theoretical model to capture the dynamic interaction of all factors involved. No research analyzes the issue of income disparity from the perspective of educational investment and financial constraints, or from microindividuals' choices of human and physical capital.

b. Plenty of research outside China conducts theoretical analysis on educational investment and financial constraints, etc. However, none of them deal with the problem under a dual economic structure. Perhaps the dual economic structure does not have any obvious relevance to developed countries, but it has a deep, long-term impact on China's income distribution; therefore, a model that incorporates this dual economic structure is needed to explain China's actual income gap problem.

In this paper, we study China's inequality problem in a Markov switching OLG model that captures the dual nature of the Chinese economy and incorporates education, migration and financial constraints. We focus on the long-term interaction of these variables with income inequality in China.

Ⅲ. The Basic Model.

The model we employ is an overlapping generations model. There is a continuum of agents of total mass 1. At the beginning of each period, the newborn young person receives an inheritance from the previous generation and distributes it between education (human capital) and savings (physical capital). At the end of the period, the young person ages and becomes an elderly person. Simultaneously, a new generation of young people is born; also, the elderly person receives returns on his investment in human capital (wages) and physical capital (interest) and distributes this wealth between consumption and bequests to the next generation. After the elderly person dies, the newborn young person enters the next period, receives an inheritance from the previous generation, and repeats the same process described above.

Our model is mainly concerned with the long-term dynamic evolution and comparative analysis of the income gap and education choice, rather than an attempt to accurately predict the values of these variables at some point in time. We carry out a simulation of the data to reflect the dynamic evolution process of China's resident income gap and fix the length of each period to be ten years[3], using this number to set the relevant parameters.

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[3] 10 years defines one generation, which basically reflects the time period of an individual from junior high school to university graduation. If we set one generation to a longer period and adjusted relevant parameters, this would only "compress" the dynamic process; the basic model and conclusions of the comparative static analysis would not undergo significant changes.

3.1. The Basic Economic Environment and Its Decision-Making Process

The basic economic environment of the model is defined below.

3.1.1. Dual Economic Structure

Consider a country composed of two economic systems, $E = (m \quad a)$, in which m indicates the urban economic system and a indicates the rural economic system. In any period t ($t = 1, 2, 3 \cdots$), the total combined population of the city and the countryside is 1. Starting in 1979, the model's initial conditions are set such that the proportion of the rural population is 0.8 and the proportion of the urban population is 0.2.

3.1.2. The Population Density Function for the Initial Inheritance

At the beginning of period t, the young person receives the inheritance left by the elderly person from the previous period. Let f_{t0} be the population density function of the population possessing inheritance $b_{t0}^{E,S}$ （ $E = (m \quad a)$, $S = [h \quad l]$ ） equals $f_{t0}^{E,S}$, $\sum_{E,S} \sum_{b_{t0}^{E,S}} f_{t0}^{E,S} = 1$.

S indicates the state of individual wage income. For both urban and rural areas, there are two possible states of wage income, $S = [h \quad l]$, in which h and l indicate high and low, respectively. In each of the urban and rural areas, initial conditions are such that half of the area's population is in each-income state.

3.1.3. Migration from the Countryside to the City

The urban population is assumed to not migrate to the countryside, but the rural population has two ways to migrate to the city.

One is through education; in this method, the individual does not have to pay the cost of migration. Rural students go to university and find jobs in the city after graduation. Those students are usually permitted permanent residence in the city. At the beginning of period t, T_e of rural human capital is transferred to the urban population through education, 50% of which becomes high-income urban residents. The paper sets $T_e = 5\%$ in each generation [4].

For rural residents, the other path to the city is by paying a migration cost. At the beginning of each period t, rural individuals can choose to move to urban areas by paying $T_c = 50\%$ [5] of rural per capita GDP. Each migrated individual has a 50% chance of becoming a high- or low-income urban resident. According to the principle of maximization of expected utility, a rural individual will decide to move to the city or remain in the countryside on the basis of the relative magnitude of the expected returns.

3.1.4. The Accumulation of Human Capital – the Education Function

At the beginning of period t, after the rural individual migrates to the city, the population density function changes from f_{t0} to f_{t1}. For the economic system E and wage income state S, the young individual distributes his inheritance $b_t^{E,S}$ between education $e_t^{E,S}$ and savings (physical capital) $s_t^{E,S}$, with $b_t^{E,S} = e_t^{E,S} + s_t^{E,S}$. We use a function

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[2] In 2009, the total population of freshmen at colleges and universities was 6.395 million, while the total population of the countryside was 712.88 million (China Statistical Yearbook, 2010 edition). The Department of Education's data indicated the ratio of incoming college freshmen from rural areas was approximately 55%. Therefore, the ratio of rural residents who migrated to the cities through education was $(6.395 \times 55\%) / 712.88 \approx 0.5\%$.

[5] Xiaoxi Lv (2008) estimated these transition costs to be 667 Chinese Yuan, approximately 7% of that year's rural per capita income of 4140 Yuan. Accounting for the city's relatively higher living costs, this ratio will increase further.

$h^E(e_t^{E,S}) = \gamma_0^E + \ln(1 + \gamma^E e_t^{E,S})$ to describe the accumulation process of the educated population, where $e_t^{E,S}$ is investment in education, $h^E(e_t^{E,S})$ is the amount of human capital, $h^E(0) = \gamma_0^E$ indicates the basic level of education of economy E, and $h^{E'}(0+) = \gamma^E > 0$ represents economy E's marginal return to education[6], with $\lim_{x \to \infty} h^{E'}(x) = 0$.

The modes of human and physical capital accumulation are vastly different. The education function we employ is nonlinear, increasing and concave, a reflection of the fact that human capital accumulation is a gradually declining process. Society's overall human capital stock is influenced by the distribution of individual education investment; the more equally distributed education investment is among groups of people, the closer society will be to the maximum level of human capital. Meanwhile, the accumulation of physical capital is linear. The total amount of physical capital of society as a whole is independent of the state of the distribution of physical capital among groups of people. This distinction between human and physical capital plays an essential role in the discussion of income disparity later in this article.

3.1.5. The Production Function

In period t, after individuals have allocated resources between education and savings, the urban and rural areas enter the production process. The production function for urban areas is a Cobb-Douglas production function with constant returns to scale (Chen & Li, 2004; Galor & Moav, 2003), $Y_t^m = A_t^m(H_t^m)^{1-\alpha}(K_t)^\alpha = A_t^m H_t^m (k_t)^\alpha$, where α is the elasticity of capital output ($\alpha = 1/3$)[7], K_t is total

urban and rural savings for period t (physical capital investment), H_t^m equals total human capital in the urban population for period t, $k_t^m = \dfrac{K_t^m}{H_t^m}$ is the ratio of capital to labor, A_t^m equals the level of technology ($A_1^m = 2$, $A_t^m = (1 + R_A^m)A_{t-1}^m$), and R_A^m, the urban growth rate of technology during one period is 15% [8].

For the rural areas, we use the Leontief function of land and labor. This is mainly because land and labor are poor substitutes for one another, and also due to the lack of physical capital in the countryside relative to the cities. Therefore, $Y_t^a = A_t^a \min(\dfrac{R^a}{m^a} \quad \dfrac{H_t^a}{n^a})$, where A_t^a is the level of technology in the countryside for period t, and $A_t^a = (1 + R_A^a)A_{t-1}^a$, where R_A^a is the rate of technological growth in the countryside. To reflect the fact that rural areas are less technologically advanced than their urban counterparts, we set the level of technology in the countryside $A_1^a = 1$ for period 1 and let the rural rate of technological advancement for one period $R_A^a = 0.1 \leq R_A^m$ [9]. R^a represents land used for agricultural production; the

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[6] Strictly speaking, γ^E should be the marginal return to education since $e_t^{E,S}=0$, i.e., the "return on initial education."

[7] The determination of China's elasticity of capital production differs highly among researchers. Kunting and Liutang (2006) consider it to be 0.1, but Zelin

(2005) determines it to be 0.503, whereas Yanbin et al. (2009) believe the elasticity of urban capital output is between 0.45 and 0.50. U.S. capital output share has been determined to lie between 0.36 and 0.4 (Aiyagari, 1994; Krusell & Smith, 1998; Castaìeda et al., 2003).

[8] The parameter value for initial technology is only subject to nonzero output in the city and countryside during the first period. Concerning technical progress, different calculation methods lead scholars to different representations of total factor productivity. However, it is universally believed that the growth rate of China's total factor productivity is not high in comparison to other developing countries. Shu (1993) believes total factor productivity grew by 0.02% between 1952 and 1990. Qingwang and Junxue (2005) believe, after comparing various methods, that total factor productivity rose by 0.891% between 1979 and 2004. Bin and Zeng (2009) believe the value rose by 2.5% from 1978 to 2007. This article determines the urban rate of technical progress to be 1.5%.

[9] Wang et al (2010) estimate the total factor productivity in agriculture to be 0.974%, a little lower than the average for the entire country. We assume an annual rural technical growth rate of 1%.

amount of land is held constant. We set rural land $R^a = 0.5 < 0.8$ to reflect the fact that there has been a large population and a scarcity of land in China. For simplicity, we set the ratio of land output, m^a, and the ratio of education output, n^a, both equal to 1. H_t^a is total human capital for period t.

3.1.6. Constraints on the Lending of Capital

Individual savings $s_t^{E,S}$ satisfy the constraints on lending $s_t^{E,S} \geq -c^E$, where $c^E = (\ c^m \ \ c^a\ )$ indicates the maximum loan values for the city and countryside.

3.1.7. Income from Wages and Income from Capital

After production in period t, in a competitive market, equilibrium wages per unit of human capital in urban and rural areas are $\bar{w}_t^m = (1-\alpha) A_t^m (k_t^m)^\alpha$ and $\bar{w}_t^a = A_t^a \min\left(\dfrac{R^a}{m^a H_t^a} \quad \dfrac{1}{n^a} \right)$, respectively. Capital return is $R_t = 1 + \alpha A_t^m (k_t^m)^{\alpha-1} - \delta$, where δ denotes the depreciation rate. The one-period capital depreciation rate δ in urban areas is 50%[10].

Let $\Delta = \left(\Delta^m \quad \Delta^a \right)$ denote the fluctuation in wages per unit of human capital in urban and rural areas. The wage per unit of human capital with high income is $w_t^{E,h} = \bar{w}_t^E (1+\Delta^E)$, and the wage per unit of human capital with low income is $w_t^{E,l} = \bar{w}_t^E (1-\Delta^E)$; in either case, $\bar{w}_t^E$ is the average wage of economy E. The wage fluctuation in the city

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[10] The depreciation rate is estimated differently by different researchers. Hu (1998) believes it to be 5%; Young (2000) and Hall & Jones (1999) estimate a value of 6%, while Chen (2009) assumes a depreciation rate of 5.2%.

and the countryside is $\Delta = \begin{pmatrix} 0.5 & 0.5 \end{pmatrix}$, reflecting the fact that in reality, there is a gap of approximately 300% between high-wage and low-wage labor income (Li Junqing and Han Qiheng, 2010, 2011).

The states of wage income follow a first-order Markov process. The probability of transition from state S at the beginning of the period to state S' at the end of the period is given by $g_t(S,S')$. The transition probability for this process is a 2×2 matrix g_t:

$$g_t = \begin{pmatrix} g_t(h,h) & g_t(h,l) \\ g_t(l,h) & g_t(l,l) \end{pmatrix}$$

where, for example, $g_t(h,l)$ is the probability of transition from the high-wage income state to the low-wage income state. The following restriction must also be satisfied:

$$g_t(h,h) + g_t(h,l) = 1; \ g_t(l,h) + g_t(l,l) = 1.$$

We refer to Li Junqing & Han Qiheng (2010) and Cheong & Wu (2010) for the notion that China, more so than developed nations, has a high degree of intergenerational income elasticity (Yao & Zhao, 2006). The transition matrix values for urban and rural wage income states are set at:

$$g_t = \begin{pmatrix} 0.9 & 0.1 \\ 0.1 & 0.9 \end{pmatrix}.$$

3.1.8. The Utility Function

At the end of period t, an individual's income state is realized. The elderly individual receives his lifetime wage income and returns to capital, with total wealth received denoted by

$$I_t^{E,S} = \bar{w}_t^E h_t^{E,S} (1 \pm \Delta^E) + s_t^{E,S} R_t + R_t(1-\delta).$$ The elderly individual distributes his wealth $I_t^{E,S}$ between consumption $c_t^{E,S}$ and bequest $b_{t+1}^{E,S}$ such that $I_t^{E,S} = c_t^{E,S} + b_{t+1}^{E,S}$. His utility function is $U(I_t^{E,S}) = (1-\beta)\ln(c_t^{E,S}) + \beta\ln(\bar{\theta} + b_{t+1}^{E,S})$. Using

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logarithms in the utility function may cause the savings rate to increase as wealth increases, in accordance with the Kaldorian-Keynesian hypothesis. In addition, the function has the form of CRRA (constant relative risk aversion), which is also used by Galor and Moav (2003) and Townsend and Ueda (2006). $\beta = 2/3$ reflects the individual's degree of concern for the next generation, and $\bar{\theta} = 2$ is the magnitude of basic consumption. The city and the countryside both produce and consume the same product.

3.1.9. Entering the Next Period

After allocating his wealth, the elderly person dies. The new young person enters period $t+1$ and receives the inheritance $b_{t+1}^{E,S}$. The population density function for the inheritance at the beginning of period $t+1$ is given by $f_{(t+1)0}$.

3.2. Distribution between Education and Savings

At the beginning of period t, the five equilibrium variables are set: the ratio of capital to labor, k_t; urban human capital in the high-income state, $H_t^{m,h}$; urban human capital in the low-income state, $H_t^{m,l}$; rural human capital in the high-income state, $H_t^{a,h}$; and rural human capital in the low-income state, $H_t^{a,l}$. An individual distributes his inheritance $b_t^{E,S}$ between education $e_t^{E,S}$ and savings $s_t^{E,S}$. He chooses education $e_t^{E,S}$ and consumption $c_t^{E,h}$ and $c_t^{E,l}$ after the state has been realized at the end of the period to maximize the expected utility at the end of the period:

$$\max_{e_t^{E,S}, c_t^{E,h}, c_t^{E,l}} g_t(S,h)U(I_t^{E,h}) + g_t(S,l)U(I_t^{E,l})$$

where:

$$U(I_t^{E,h}) = (1-\beta)\ln(c_t^{E,h}) + \beta\ln(\bar{\theta}+b_{t+1}^{E,h}) \quad (1)$$

$$U(I_t^{E,l}) = (1-\beta)\ln(c_t^{E,l}) + \beta\ln(\bar{\theta}+b_{t+1}^{E,l}) \quad (2)$$

$$I_t^{E,h} = c_t^{E,h} + b_{t+1}^{E,h} \quad (3)$$

$$I_t^{E,l} = c_t^{E,l} + b_{t+1}^{E,l} \quad (4)$$

$$I_t^{E,h} = \bar{w}_t^E h_t^{E,S}(1+\Delta^E) + s_t^{E,S}R_t + R_t(1-\delta) \quad (5)$$

$$I_t^{E,l} = \bar{w}_t^E e_t^{E,S}(1-\Delta^E) + s_t^{E,S}R_t + R_t(1-\delta) \quad (6)$$

$$b_t^{E,S} = e_t^{E,S} + s_t^{E,S} \quad (7)$$

$$s_t^{E,S} \geq -c^E \quad (8)$$

$$h_t^{E,S} = \gamma_0^E + \ln(1+\gamma^E e_t^{E,S}) \quad (9)$$

$$\bar{w}_t^m = (1-\alpha)A_t^m(k_t^m)^\alpha \quad (10)$$

$$\bar{w}_t^a = A_t^a \min(\frac{R^a}{m^a H_t^a}, \frac{1}{n^a}) \quad (11)$$

$$R_t = 1 + \alpha A_t^m(k_t^m)^{\alpha-1} - \delta \quad (12)$$

$$k_t = \sum_{E,S}\sum_{f_{t1}^{E,S}} s_t^{E,S}f_{t1}^{E,S} \Big/ \sum_{E,S}\sum_{f_{t1}^{E,S}} h_t^{E,S}f_{t1}^{E,S} \quad (13)$$

$$H_t^a = H_t^{a,h} + H_t^{a,l} \quad (14)$$

$$\sum_{E,S}\sum_{f_{t1}^{E,S}} f_{t1}^{E,S} = 1 \quad (15)$$

For $E = (m \quad a)$ and $S = [h \quad l]$, the variables satisfy the following:

$I_t^{E,S} \geq 0$, $c_t^{E,S} \geq 0$, $b_{t+1}^{E,S} \geq 0$, $b_t^{E,S} \geq 0$, $e_t^{E,S} \geq 0$, $c^E \geq 0$, $h_t^{E,S} \geq 0$, $\bar{w}_t^E \geq 0$, $R_t \geq 0$, $H_t^a \geq 0$, and $f_{t1}^{E,S} \geq 0$.

Equations (1) and (2) are utility functions for the high- and low-income states. Equations (3) and (4) describe how wealth in high- and low-income states is distributed after the states are realized. Equations (5) and (6) are wealth in high- and low- income states. Equation (7) describes how the individual allocates his inheritance to education and savings. Equation (8) is the lending constraint in the capital market; equation (9) is the education function. Equations (10) and (11) are wages per unit of human capital in urban and rural areas. Equation (12) is the return on physical capital, and equation (13) is the ratio of capital to labor.

Equation (14) requires that total rural human capital equals the sum of rural high-income and low-income labor. Equation (15) states that the total combined population of rural and urban areas is equal to 1.

The derivation of this model and its five simulated equilibrium variables is delayed to the appendix.

Ⅳ. Quantitative Analysis

In this section, we start with the basic conclusions from the benchmark model. Then, we carry out a comparative static analysis with respect to the education parameters γ_0 and γ and the financial lending constraint c . We specifically analyze the influence of these parameters on the Gini coefficient, the Kucinici turning point, and the income differential between urban and rural areas in China.

4.1. The Benchmark Model

We first discuss the results of the benchmark model using the parameters stated below. The results of the model reflect the basic dynamic process of the income gap (Gini coefficient).

4.1.1. Setting the Parameters

The benchmark model is the foundation for comparative static analysis. The basic parameters were introduced in section 3; here, we provide the parameter values required for comparative static analysis.

The basic level of education in urban and rural China is given by $\gamma_0 = \begin{pmatrix} \gamma_0^m & \gamma_0^a \end{pmatrix} = \begin{pmatrix} 1 & 1 \end{pmatrix}$, and the marginal return on education is $\gamma = \begin{pmatrix} \gamma^m & \gamma^a \end{pmatrix} = \begin{pmatrix} 3 & 3 \end{pmatrix}$[11]. We allow rural and urban residents to buy physical assets but prohibit shorting of these assets**;** thus, urban and rural lending constraints are given by $c^E = \begin{pmatrix} 0, 0 \end{pmatrix}$.

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[11] Refer to Galor and Moav (2003).

4.1.2. The Main Conclusions from the Benchmark Model.

We focus on the Gini coefficients of wages, income and wealth. *Wages* refers to rural or urban labor wages, and *income* is the sum of income from wages and assets. Wages and income are flow, and *wealth* (actually, net wealth) is equal to total assets accumulated by residents less residents' total liabilities. The main conclusions regarding the Gini coefficients are as follows:

4.1.2.1. The Dynamic Evolution of Human Capital and Return on Physical Assets

The model shows that during the early stages of an economy's development, returns on physical capital are higher than returns on human capital. By the late stages of economic development, exactly the opposite is the case: returns on human capital are higher than returns on physical capital. Furthermore, during all periods of economic development, urban returns to human capital are higher than returns in rural areas (see Fig. 2).

During the dynamic process of economic development, the ratio of physical capital to human capital rises continuously. Over periods one to eight, the ratios are 0.29, 0.21, 0.31, 0.48, 0.72, 1.04, 1.44, and 2.05. This result indicates that during the early stages of an economy's development, physical capital is scarce relative to human capital; indeed, the ratio of physical capital to human capital is low prior to the sixth period. After period six, this causes returns of physical capital to exceed returns to human capital (see the relevant data in Fig. 2 for urban individuals before period 4, and for rural individuals before period 5). Although physical capital accumulates linearly, human capital accumulates in a nonlinear way (in a concave function), and thus human capital is scarce relative to physical capital during the late stages of economic development. The ratio of physical capital to human capital becomes quite high (larger than 1) after period 6; at that time, returns on human capital relative to physical capital are higher (see the relevant data in Fig. 2 for urban

residents after period 4, and for rural residents after period 5).

China's current stage of development is gradually beginning to exhibit increasing returns to human capital. In a study of six provinces, the World Bank (2009) showed that the rate of return per year of education among urban wage workers grew from 4.4% in 1988 to 11.4% by 2003. Subsample data from a survey by China's National Bureau of Statistics showed that in 2003, the rate of return for each year of education was 11.6% in urban areas. The increase in returns to education for people who have received a relatively high level of education is strikingly clear (Kanbur & Zhang, 2005). When compared to workers with elementary school levels of education, the average college-educated worker had 25% higher annual wages in 1988. In 2003, the advantage of a college education generated 70% higher wages than an elementary school education. During these 15 years, China moved from having relatively low returns in education to having relatively high returns; in comparison with other countries, the value of education in China has been increasing. Because disparities in human capital are relatively large among Chinese residents, returns on human capital will widen the wage gap. Knight and Song Lina (1999) estimate that the increase in returns to education alone accounts for 12% of the increase in the wage gap among urban workers from 1988 to 1995.

Fig. 2. The Dynamic Evolution of Returns on Human and Physical Capital
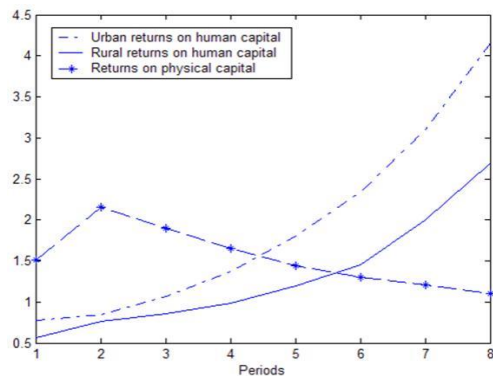
4.1.2.2. The Dynamic Process of the Gini Coefficients

The wage (income and wealth) Gini coefficients for the cities, countryside and the entire country each display a U-shaped dynamic evolution (see Fig. 3). As urban, rural and national GDP increase with each period, the benchmark model demonstrates that the dynamic evolution of the Gini coefficient fits with Kucinici's upside-down U curve hypothesis. In other words, as national income increases, the Gini coefficient initially rises but subsequently enters a downward trend. The results fit Rauch's (1993) conclusions well. Rauch references Harris and Tadaro's (1970) model, stating that the economic growth of developing countries will lead to a change in the income gap in which it follows a U-shaped curve.

The mechanism responsible for this phenomenon is as follows. In the early stages of development, owing to the fact that average incomes in cities are low, only wealthy individuals are able to bequeath to their children an inheritance supporting further investment in education. The fact that children of the wealthy have relatively high levels of education enables them to earn higher wages. By contrast, the poor can only afford basic consumption, preventing them from leaving inheritances to their children and suppressing education levels and wages. In the early stages of economic development, the inheritance gap between the rich and poor causes wages of rich children to increase faster than those of poor children; thus, the wage gap (Gini coefficient) between the rich and poor tends to increase.

A similar mechanism is reflected in the dynamic change of the income (wealth) Gini coefficient, which increases even as all wages are growing, during the early stages of development. This is not the result of accelerated wage increases for the rich; instead, it is a consequence of lagging wage growth by the poor (the rich experience a higher rate of wage growth than the destitute). From 1988 to 2003, a comparison of those with the highest and lowest wages in urban China revealed that annual rates of wage growth differed by approximately 8 percentage points. Compared to the United States, between 1964 and 1988 the difference

in growth between the highest and lowest wage earners was less than 2 percentage points, only a quarter of that in China (World Bank, 2009).

The situation evolves during later stages of economic development. Since human capital accu-mulation is concave and decreases in outer periods, the marginal return of human capital from education decreases for the wealthy. They are still better equipped to provide their children with a superior education, but the growth of their children's wages decreases. At this time, poor children's wages grow faster, closing the wage gap between the rich and the poor in the new generation of urban residents. The Gini coefficient for cities decreases gradually, with the same trend also reflected in income (wealth) Gini coefficients during later periods.

Fig. 3. The Dynamic Change in Gini Coefficients of Urban, Rural and National Wages (income and wealth)

(a)
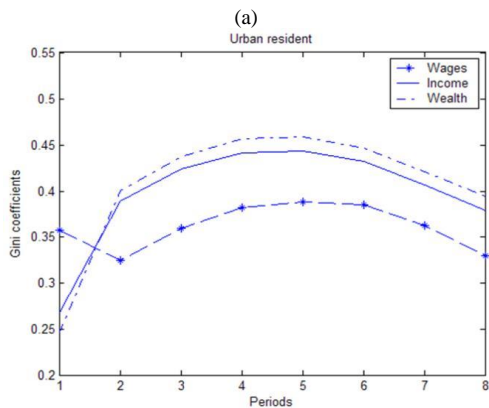
Note: The dynamic evolution of Gini coefficients for urban resident wages (income and wealth).

(b)
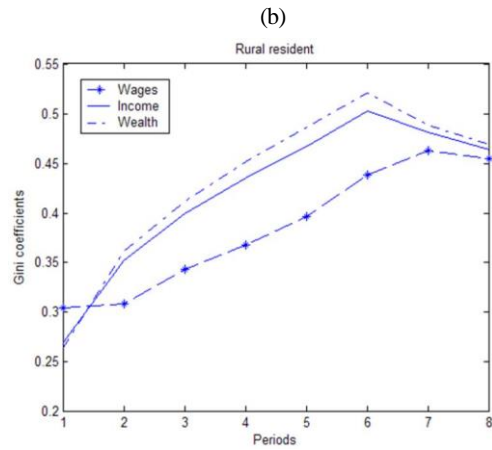
Note: The dynamic evolution of Gini coeffi-cients for rural resident wages (income and wealth).

(c)
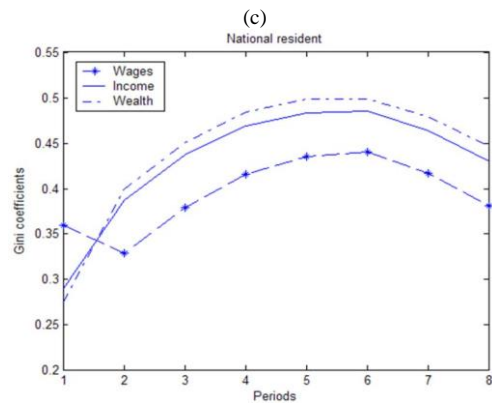
Note: The dynamic evolution of Gini coefficients for national resident wages (income and wealth).

4.1.2.3. The Kucinici Turning Point for Urban and Rural Wages

The model shows that the Kucinici turning point for wages comes later in the countryside than in cities (see Fig. 3a, 3b and 3c). For example, the maximum value of the Gini coefficient of urban residents' wages is 0.3888 – this is the Kucinici turning point, appearing in period 5. On the other hand, the maximum value of the Gini coefficient of rural residents' wages is 0.4629, occurring in period 7. Income and wealth follow the same pattern because, on average, urban residents have higher income than rural residents; urban children receive better education than rural children, causing

urban residents to reach the second half of the education function sooner. In the second half of the education function, as human capital accumulation slows, urban residents experience wage convergence and the Gini coefficient decreases. The countryside reaches the second half of the education function later, delaying arrival of the Kucinici turning point. The basic reason for these differences is that urban areas have higher average levels of education, allowing them to reach the Kucinici turning point sooner and enter a period in which the income gap begins to decrease. Zhou (2009) believes that China's Kucinici turning point occurred around 2009; actual data shows China remains in early stages prior to the Kucinici turning point. Whether or not China can smoothly reach the Kucinici turning point even sooner depends on whether the country can increase the average level of basic education in the countryside.

4.1.2.4. The Gini Coefficients for Wages, Income and Wealth

Across China, the Gini coefficient of wages is lower than that of income, which in turn is lower than that of wealth. The gap between the wage Gini coefficient and the income Gini coefficient mostly reflects disparity in individual investment in physical capital. In all stages of economic development, wealthy individuals may, in general, make larger investments in physical capital assets (savings), resulting in higher levels of asset-based income. Thus, overall income increases, and so the Gini coefficient of income is higher than the Gini coefficient of wages. As the economy develops, however, returns on physical capital will be lower relative to returns on labor. This causes the gap in the Gini coefficients of income and wages to gradually decrease, which can be seen quite clearly in the case of the countryside (see Fig. 3b after period 6). In addition, this model shows that the gap in the Gini coefficients of wealth and income is not large. This is in agreement with empirical data: Chen, Zhen, & Chen (2009) showed that in 2007, China's urban income and wealth Gini coefficients were 0.57 and 0.58, respectively, with rural income and wealth Gini

coefficients of 0.45 and 0.62, respectively. China's property-based income has always been lower than in developed countries. Li Shi (2005) states that in 1995 and 2002, China's urban Gini coefficient of wealth was 0.52 and 0.48 respectively, while the rural Gini coefficient of wealth was 0.33 and 0.44, respectively. In these years, the US Gini coefficient of wealth was 0.78.

4.2. Comparative Static Analysis

In this section, we study the impact of lending constraints and education on income disparity.

4.2.1. The Impact of Education on Income Disparity

We can illustrate the influence of education on income disparity by changing parameters γ_0 and γ in the education function. These two parameters have different economic implications. Changing γ_0 adjusts the basic level of education of all residents and the starting point for further education; increases in γ_0 indicate improvement in the average level of education, a process leading to educational equalization. Alternatively, manipulating γ changes the marginal return for education. Increases in γ indicate that a one unit increase in educational input results in larger additions to human capital.

4.2.1.1. The Impact of Increasing the Basic Level of Education, γ_0, on the Gini Coefficient

We first examine how the Gini coefficient and other variables are affected by simultaneous increases in γ_0 in urban and rural areas. Then, we explore the effects of changing γ_0 separately in these two areas.

1) The Impact of Simultaneous Increases in γ_0 in Urban and Rural Areas on the Gini Coefficient and the Kucinici Turning Point

We examine how the Gini coefficients for cities, the countryside and China as a whole change if we

increase γ_0 from 1.0 to 1.25 or 1.50 synchronously in cities and the countryside. We find that the simultaneous increases in γ_0 have a remarkable influence on both the Gini coefficient and the Kucinici turning point (see Fig. 4a, 4b and 4c):

These changes have 3 effects on the Gini coefficient: (a) the Gini coefficients for cities, the countryside and the overall country are markedly reduced; (b) the Gini coefficient in cities decreases more significantly than in the countryside; and (c) higher returns on human capital (present in later stages of economic development) are associated with greater reductions in the Gini coefficient.

The mechanism behind these movements is as follows (as an example, we use the urban Gini coefficient; this is equally applicable to rural areas). Improvements in basic education in cities ensure both the rich and poor achieve relatively higher levels of education. As a result, both groups reach the latter half of the education function sooner; there, the speed at which education facilitates human capital accumulation decreases. Although the rich have access to better education, the poor accumulate human capital more quickly, and because the wage gap is a product of human capital disparity between the rich and poor, it subsequently decreases.

Since returns to human capital in urban areas far exceed those in the countryside, educational equalization (i.e., increasing the urban γ_0) can narrow the urban wage gap more effectively. Because rural areas are characterized by relatively low returns in human capital, educational equalization is less likely to significantly narrow the wage gap in the countryside.

In the first half of the education function, the rate of human capital accumulation, facilitated by educational investment, grows relatively quickly. Considering that the poor are always located in this region, higher returns to human capital (again, found in later stages of economic development) are, assuming basic education is improved, effective in narrowing the gap between the rich and the poor. In early stages of economic development – when returns to human capital are not as high – the effect of improving the basic level of education on the income Gini coefficient is not as clear (see Fig. 4c).

We also find that overall improvement in education can shift the Kucinici turning point. The urban and rural Gini coefficients of wages (and, additionally, of income and wealth) reach the Kucinici turning point sooner. Regarding the Gini coefficient of national income, if the overall education level γ_0 rises from 1 to 1.25, and again to 1.5, the Kucinici turning point of income shifts from period 6 (with a Gini coefficient of 0.4856) forward to period 5 (Gini coefficient of 0.4532), and again to period 4 (Gini coefficient of 0.4379), respectively. This shift is more evident in cities than in the countryside, the result of improvements in overall urban (rural) education levels leading to urban (rural) residents reaching the second half of the education function sooner. Once this occurs, urban or rural areas can more quickly attain smaller Gini coefficients. Because urban residents are closer to the second half of the education function than their rural counterparts, forward shifts in the Kucinici turning point are more obvious in cities than in the countryside. Nationally speaking, however, the Kucinici turning point shifts forward in a relatively visible way (see Fig. 4c).

Fig. 4. The Impact of Simultaneous Increases in Urban and Rural γ_0 on the Gini Coefficients of Urban, Rural and National Income.

(a)
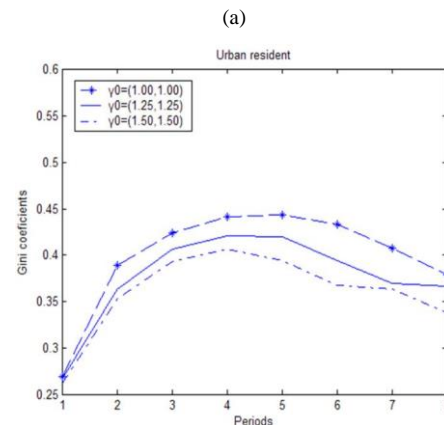
Note: The impact of simultaneously increasing urban and rural γ_0 on the urban income Gini coefficient

(b)

Rural resident
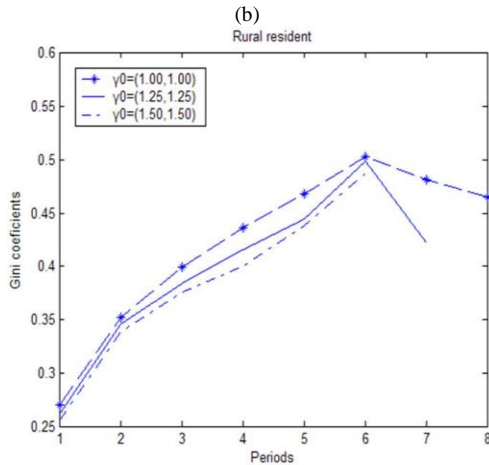
Note: The impact of simultaneously increasing urban and rural γ_0 on the rural income Gini coefficient

(c)

National resident

Note: The impact of simultaneously increasing urban and rural γ_0 on the national income Gini coefficient. In the upper left of each Fig., the numbers in parentheses represent values of γ_0 in urban and rural areas, respectively.

2) The Impact of Separate Increases in γ_0 in Urban and Rural Areas on the National Income Gini Coefficient

In order to explore how urban and rural basic education levels affect national income disparity, we begin by selecting two groups of param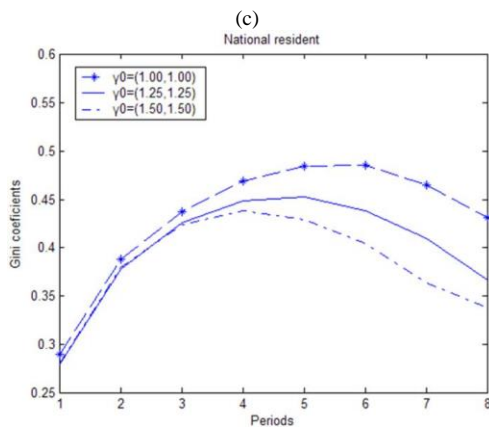eter γ_0—in both urban and rural areas — to carry out the comparative analysis. First, we hold γ_0 in rural areas equal to 1 and increase γ_0 in urban areas from 0.5 to 0.75, and again from 0.75 to 1. Next, conversely, we fix γ_0 in urban areas at 1 and increase γ_0 in rural areas from 0.5 to 0.75, and again from 0.75 to 1. This approach allows us to

study how, in each area (urban or rural), improvement in basic education levels influences income discrepancies.

Improving either urban or rural basic education (increasing the respective parameter γ_0 from 0.5 to 1) can effectively decrease the Gini coefficient of national wages, income and wealth. Specifically, improving basic education in the countryside lowers the national income Gini coefficient more significantly than improving education in cities (see Fig. 5) due to the fact that rural human capital stock is at a lower level than urban human capital stock; hence, rural residents remain in the first half of the education function. If rural education levels improve, rural human capital is augmented, driving up wages, income and wealth. This dramatically narrows urban-rural income disparity and decreases the Gini coefficient of national wages, income and wealth. Improvement in the level of rural human capital, together with increases in income, also speeds up rural migration to cities, lowering the Gini coefficient of national wages, income and wealth.

Fig. 5. The Impact of Separate Increases in γ_0 in Urban and Rural Areas on the National Income Gini Coefficient.
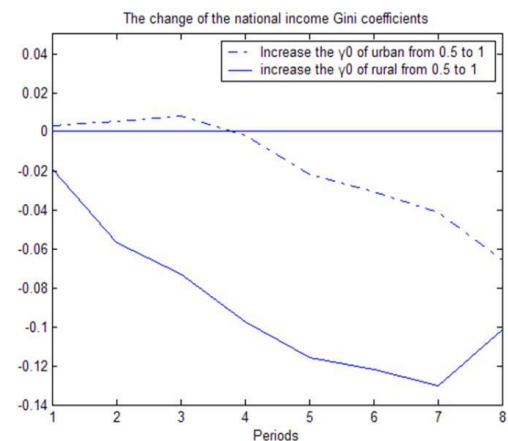
Alternatively, if basic education levels in cities improve, the effect on urban human capital is limited due to the relative height of the existing urban human capital stock and the location of city residents in the

second half of the education function. An increase in urban human capital may narrow urban wage and income gaps, decreasing the national wage and income Gini coefficient; however, it can also lead to increases in average urban wages and incomes, widening urban-rural income disparity and increasing the national wage and income Gini coefficient. In total, increases in basic education levels in urban areas lower the national income Gini coefficient, but less so than improvements in rural basic education (see Fig. 5).

4.2.1.1. The Impact of an Increase in the Marginal Return in Education, γ, on the Gini Coefficient and the Kucinici Turning Point

The impact on the Gini coefficient of a change in γ – the marginal return to education – is essentially the opposite of the impact of a change in γ_0. Since urban and rural marginal returns to education tend to rise and fall synchronously, we focus on increasing the two parameters simultaneously rather than separately.

Fig. 6. The Effects of Simultaneous Increases in Urban and Rural γ on the Gini Coefficients of Urban (6a), Rural (6b) and National (6c) Income.

(a)

(b)

(c)
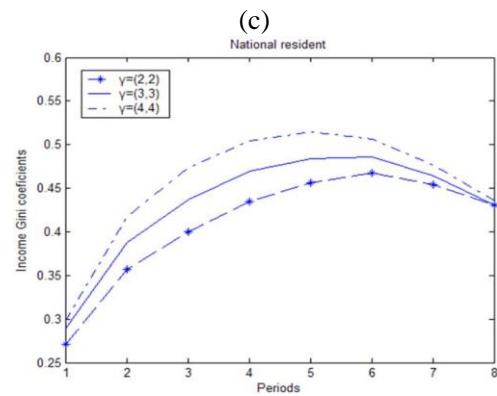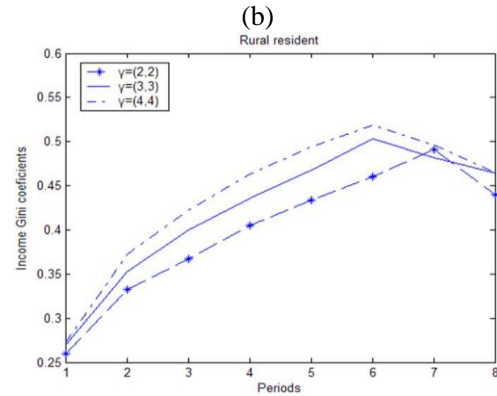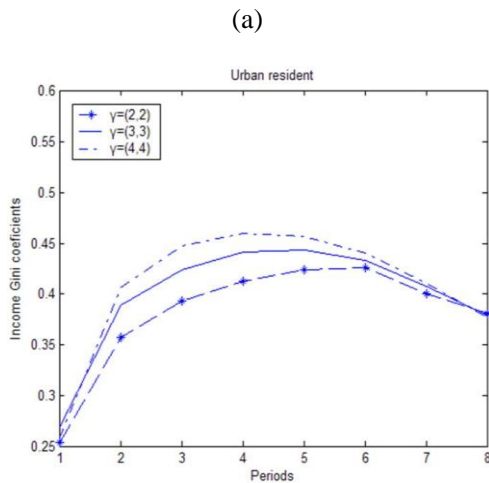
Note: In the upper left, the numbers in parentheses represent values of γ in urban and rural areas, respectively.

To explore the impact on each Gini coefficient, we increase the urban and rural values of γ from (2,2) to (3,3), and again from (3,3) to (4,4). We find that increasing the marginal return to education affects the Gini coefficient in two ways: (a) each Gini coefficient increases and (b) the Kucinici turning points of all Gini coefficients shift earlier.

The impact of these changes on each Gini coefficient are summarized by the following 3 effects (see Fig. 6): (a) the Gini coefficients of urban, rural and national income increase dramatically; (b) the increase in the income Gini coefficient of rural areas is larger than that of urban areas; and (c) the urban-rural income gap widens.

Increasing the marginal return in urban (rural) education enables the urban (rural) rich to earn higher wages by attaining relatively higher levels of education. Due to their relatively low levels of education, poor

urban (rural) residents cannot enjoy the benefits of the increased marginal returns in education, leading to a rise in the urban (rural) income Gini coefficient (Figs. 6a, 6b and 6c).

The marginal return in education has more of an effect on the rural Gini coefficient (see Table 1). Because rural residents' education levels generally place them in the first half of the education function – where education affects the accumulation of human capital more significantly – differences in human capital stock are more noticeable in the countryside than in cities, where residents tend to be located in the second half of the education function. This helps explain why increases in the marginal return to education are more likely to increase the resident wage Gini coefficient in the countryside than in cities.

We also find that increases in the marginal return in education cause the urban, rural and national Gini coefficients of wages (and also of income and wealth)

to reach their Kucinici turning points sooner. Consider the Gini coefficient of national income (Fig. 6c). If the marginal return in education, γ, rises from 2 to 4, the Kucinici turning point of income will shift from period 6 (income Gini coefficient of 0.4672) to period 5 (income Gini coefficient of 0.5146). In this case, an increase in the urban (rural) marginal return in education leads to increases in income and education inputs, allowing urban (rural) residents to reach the second half of the education function sooner, decreasing their returns in education. As a result, urban (rural) residents reach smaller Gini coefficients sooner, moving the Kucinici turning point forward. Increases in the marginal return in education cause greater Kucinici turning point shifts in cities than in the countryside; since city residents are closer to the second half of the education function, forward movements in the Kucinici turning point in cities are more evident than in the countryside.

Table 1. The Effects of Simultaneous Increases in Urban and Rural γ on the Urban and Rural Income Gini Coefficients (Increases in γ from (2,2) to (4,4))

Periods	1	2	3	4	5	6	7	8
Change in the urban wage Gini coefficient	0.0052	0.0489	0.0544	0.0474	0.0333	0.0147	0.0103	-0.0039
Change in the rural wage Gini coefficient	0.0131	0.0393	0.0552	0.0580	0.0595	0.0581	0.0055	0.0246

4.2.1. The Effect of Lending Constraints on Income Disparity

China's financial dichotomy has simultaneously caused urban financial deepening and rural financial repression. Financial (financial constraint) disparity between urban and rural areas can profoundly influence urban and rural residents' ability to borrow, which in turn impacts education (human capital) investment and the relative wage (income) gap.

We can manipulate individual lending constraints (the maximum loan amount) by changing the parameter c. When c=0, individuals may save only by purchasing physical assets. If c>0, individuals may short sell – that is, they can invest in human capital

using loans. We explore the impact on the Gini coefficients of simultaneously relaxing urban and rural lending constraints.

After loosening the urban and rural lending constraints from (0.0, 0.0) to (0.5, 0.5), we find that changes in each Gini coefficient can be summarized as follows (see Fig. 7, as only the Gini coefficients of rural, urban and national wages are given here): (a) the Gini coefficients of wages in cities, the countryside and China as a whole are markedly reduced; (b) as returns in human capital increase (the case during later stages of economic development), the Gini coefficients decrease further; and (c) the Kucinici turning point appears earlier.

Lending constraints influence the Gini coefficient of wages significantly. Irrespective of location, lending constraints are more likely to restrict the poor's ability to acquire education. Relaxing lending constraints boosts educational loans for the poor more than the wealthy, increasing the poor's education inputs and level of wages. The income gap between the rich and the poor decreases, and the Gini coefficients of urban, rural and national wages may also drop (see Fig. 7).

Relaxing urban-rural lending constraints can reduce the Gini coefficient of wages more effectively when returns to human capital are relatively high (again, usually in the later stages of economic development). This is because the poor, compared to the rich, are more likely to be located in the first half of the education function, in which additional education increases human capital relatively quickly. In this stage, where the return on human capital is high, relaxing lending constraints encourages the poor to invest more in education. This may cause the Gini coefficients of urban, rural and national wages to fall; however, if the return on human capital is relatively low, the effect of loosening lending constraints on increasing the poor's educational inputs is not significant.

Fig. 7. The Influence of Simultaneous Relaxation of Urban and Rural Lending Constraints on Gini Coefficients of (a) Urban, (b) Rural, and (c) National Wages.

(a)

(b)

(c)
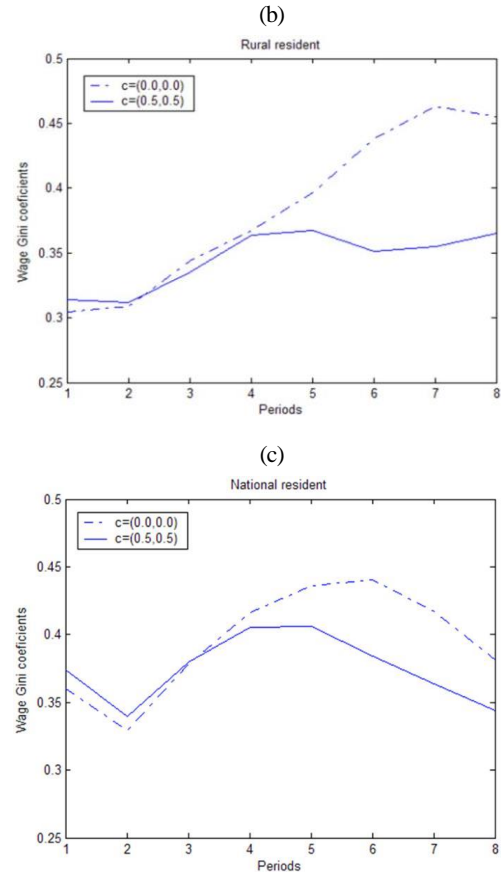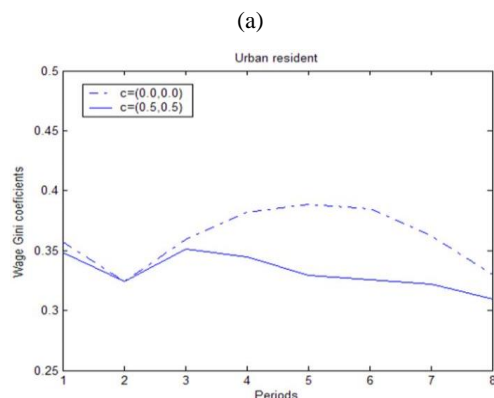
Note: In the upper left of each Fig., the numbers in parentheses represent values of c in urban and rural areas, respectively.

Less restrictive lending constraints give individuals the ability to invest in education sooner, enabling them to more rapidly reach the second half of the education function. As a result, the Kucinici turning point shifts forward in cities, the countryside and China as a whole.

V. Conclusions and Policy Suggestions

Using the dichotomous framework of OLG, this paper examines the long-term dynamic effects of education and lending constraints on income inequality in China. Comparative statics provides some insight into the influence of education and lending constraints on human and physical capital allocation and on income gaps across and within urban and rural areas. We find that over the long term, the basic policy to

narrow the urban-rural and nationwide income gaps in China is to reduce polarity in financial and education markets.

This paper shows that using different accumulation models of human and physical capital allows relative returns to adjust dynamically over time. Returns to human capital will gradually surpass returns to physical capital as the economy develops. In early stages of economic development, increasing returns to human capital aggravate the wage (income) gap, itself the result of imbalances in human capital investment. In later stages, since accumulation of human capital diminishes over time, human capital levels of the poor gradually move closer to those of the rich; consequently, the income gap and disproportionality in human capital levels may decrease. Wages (income and wealth) exhibit a U-shaped dynamic change process. With more rapid accumulation of human capital, cities reach the Kucinici turning point sooner.

Education has a profound effect on dynamic changes in the Gini coefficient. Generally speaking, increasing the basic level of education is more beneficial for the poor than the rich. Although simultaneous increases in urban and rural basic education can decrease the Gini coefficient in cities, the countryside and China as a whole, improving basic education exclusively in rural areas is more effective in lowering the national income Gini coefficient. Promoting equality in urban-rural education is a crucial policy for reducing income disparity, not only because of its ability to decrease the Gini coefficient on all levels, but also because it accelerates arrival of the Kucinici turning point. In contrast, improving the marginal returns in education has the opposite effect, favoring the rich, since on all levels, the Gini coefficient increases. In reality, the effect of educational and financial inequality on rural Chinese residents is twofold. First, due to deficiencies in rural financial markets, biases in educational investment policies affect incomes in cities more significantly. Additionally, rural residents' lack of collateral diminishes their ability to obtain financing for human capital investment; together, these factors contribute to income disparity between urban and rural populations. Research indicates that loosening lending constraints can effectively decrease the Gini coefficient of wages, especially during later stages of economic development where returns in human capital are relatively higher.

Returns in human capital are entering a period of accelerated increase in present-day China (World Bank, 2009; Kanbur & Zhang, 2005; Knight & Song, 1999). Therefore, keeping in mind the goal of decreasing Gini coefficients, improving education levels and relaxing lending constraints – especially in rural areas – are urgently needed.

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Appendices

Simulation Model Calculation Steps

The model's numerical simulation and calculation process consists of 18 steps. The main contents of each step are as follows:

Initially, in period 1, the inheritance $b_t^{E,S}$ is divided into 4000 fractions from 0 to 80 in any economy $E = \begin{pmatrix} m & a \end{pmatrix}$ and any state of wage $S = \begin{pmatrix} h & 1 \end{pmatrix}$, with the population density function of the inheritance equal to f_{10}; therefore, the urban population $\sum_S \sum_{f_{t0}^{m,S}} f_{t0}^{m,S} = 0.8$ and the rural population $\sum_S \sum_{f_{t0}^{a,S}} f_{t0}^{a,S} = 0.2$.

Given the values of parameters of migration from the countryside to the cities, T_e and T_c.

Given the values of the elasticity coefficient of urban labor output α, the urban and rural technical parameters in period 1 $\begin{pmatrix} A^m & A^a \end{pmatrix}$, the growth rate of technology $\begin{pmatrix} R_A^m & R_A^a \end{pmatrix}$, the rate of depreciation δ, land for agricultural production L^a, and the parameters in the rural production function m^a and n^a.

Given the values of fluctuation for unit wages of human capital in urban and rural areas $\Delta^E = \begin{pmatrix} \Delta^m & \Delta^a \end{pmatrix}$ and the transfer matrix g_t. The populations in the high-income and low-income states are both 0.5.

Given the values of the rural and urban capital lending parameter $c^E = \begin{pmatrix} c^m & c^a \end{pmatrix}$.

Given the values of the parameters in the urban and rural education function $\gamma_0^E = \begin{pmatrix} \gamma_0^m & \gamma_0^a \end{pmatrix}$ and $\gamma^E = \begin{pmatrix} \gamma^m & \gamma^a \end{pmatrix}$, respectively.

Given the values of the parameters in the utility function, β and $\bar{\theta}$.

For any $(t = 1, 2, 3 \cdots)$, choose the initial values of five variables: the ratio of capital to labor, k_t; urban human capital in the high-income state, $H_t^{m,h}$; urban human capital in the low-income state, $H_t^{m,l}$; rural human capital in the high-income state, $H_t^{a,h}$; and rural human capital in the low-income state, $H_t^{a,l}$.

Period t initially has one young person who receives an inheritance left by the elderly person from the previous period; the population density function of the inheritance equals f_{t0} with $E = \begin{pmatrix} m & a \end{pmatrix}$ and $S = \begin{pmatrix} h & 1 \end{pmatrix}$.

Rural individuals can move T_e of the labor force to urban areas. Each individual has a 50% chance of becoming a high- or low- income urban dweller, free of migration costs.

Based on the expected utility function, the remaining rural population will decide whether to move to the city or remain in the countryside. If a rural resident moves to the city, he or she will have a 50% chance of becoming a high- or low-income urban dweller, with migration cost T_c of rural per capita GDP for that period.

After a rural individual migrates to the city, the population density function of the inheritance changes from f_{t0} to f_{t1}.

Based on the objective function, the individual takes the inheritance $b_t^{E,S}$ that he receives and distributes it between education $e_t^{E,S}$ and savings $s_t^{E,S}$. To maximize expected utility, $b_t^{E,S} = e_t^{E,S} + s_t^{E,S}$.

Educational investment $e_t^{E,S}$ generates human capital $h_t^{E,S} = \gamma_0^E + \ln(1 + \gamma^E e_t^{E,S})$. The ratio of capital to labor at the end of period t is $k_t = \sum_{E,S} \sum_{f_{t1}^{E,S}} s_t^{E,S} f_{t1}^{E,S} \Big/ \sum_{E,S} \sum_{f_{t1}^{E,S}} h_t^{E,S} f_{t1}^{E,S}$, urban human capital in the high-income state $H_t^{m,h} = \sum_{f_{t1}^{m,h}} h_t^{m,h} f_{t1}^{m,h}$, urban human capital in the low-income state $H_t^{m,l} = \sum_{f_{t1}^{m,l}} h_t^{m,l} f_{t1}^{m,l}$, rural human capital in the high-income state $H_t^{a,h} = \sum_{f_{t1}^{a,h}} h_t^{a,h} f_{t1}^{a,h}$, and rural human capital in the low-income state $H_t^{a,l} = \sum_{f_{t1}^{a,l}} h_t^{a,l} f_{t1}^{a,l}$.

If the outcomes of step 14 are not equal to the initial values from step 8, readjust step 8 until they are equal. Then we can derive the balanced ratio of capital to labor k_t , urban human capital H_t^m , rural human capital H_t^a , urban human capital in the high-income state HH_t^m , and rural human capital in the high-income state HH_t^a .

At the end of period t , after realization of the production function, uncertainty of the state is achieved. The young individual grows old and a new young person is born. The elderly individual receives his lifetime wage income and returns to capital, with the wealth he receives equal to $I_t^{E,S}$.

The elderly individual distributes his wealth $I_t^{E,S}$ between consumption $c_t^{E,S}$ and next period's inheritance $b_{t+1}^{E,S}$, with $I_t^{E,S} = c_t^{E,S} + b_{t+1}^{E,S}$. The utility function is given by

$$U_t = (1 - \beta) \ln c_t^{E,S} + \beta \ln(\bar{\theta} + b_{t+1}^{E,S})$$.

At the end of period t, the elderly person dies and the new young person enters in period t+1. The inheritance the new young person receives from the previous generation, $b_{t+1}^{E,S}$, follows a population density function $f_{(t+1)0}^E$ at the beginning of period t+1. The simulation returns to step 9 and the process of intergenerational reciprocating begins again.

An Analysis of Entrepreneurial Skills and Competencies of Students: The Case of a Philippine University

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ABSTRACT

The profiles and Personal Entrepreneurial Competency (PEC) of all BS Agribusiness Management (BSABM) and Master of Management (MM) students enrolled in the University of the Philippines Los Baños during the second semester of Academic Year (AY) 2013-2014 were analyzed. Statistical differences among the PEC scores were tested using the Mann-Whitney U Test. In turn, the relationship or association of independent variables with dependent variables were tested using the Spearman Rank Correlation (for metric variables namely, age, number of siblings, sibling rank and student classification) and Chi Square Test of Independence (for nonmetric variables namely, sex, family business, exposure to symposiums, engagement in organization, business experience). The PEC results showed that in general, BSABM students excelled in three competencies which include goal setting, information seeking, and systematic planning and monitoring. On the other hand, MM students scored the highest in seven competencies, particularly opportunity seeking, persistence, goal setting, information seeking, systematic planning and monitoring, persuasion and networking and self-confidence. The average mean of PEC revealed that MM graduate students were better than BSABM students in nine (9) competencies which were opportunity seeking, persistence, commitment to work contract, demand for quality and efficiency, goal setting, information seeking, systematic planning and monitoring, persuasion and networking and self-confidence. However, BSABM students were able to outscore MM students in terms of risk-taking. The Chi-Square Test of Independence showed that exposure to symposiums was significantly correlated with opportunity seeking and information seeking. Engagement in organization was found to be significantly associated with opportunity seeking, and persistence. Moreover, having a family business was also found to be significantly related with information seeking. The ordinal logistic regression analysis showed that male students had lower persuasion and networking competency levels and students with their own businesses had higher demand for quality and efficiency, systematic planning and monitoring and information seeking competency levels. Given the above benchmark information, the Department of Agribusiness Management and Entrepreneurship (DAME) should focus on redesigning its existing degree program curricula to enhance the entrepreneurial preparedness and competencies of the students to meet the needs of the modern workplace and the competitive world of business in general. In particular, there is a need to advance the skills of the students in different areas of communication, presentation, negotiation, and networking. In support of the entrepreneurial competency development of the BSABM and MM students, the study implies the need to upgrade the knowledge and skills of the DAME faculty to build their credibility and better equip them to teach entrepreneurship courses.

Keywords: agribusiness management, entrepreneurship, goal setting, Mann-Whitney U test, opportunity seeking, ordinal logistic regression, personal entrepreneurial competency

Ⅰ. Introduction

In response to worldwide spread of 21st century education, two major concerns are currently being addressed by the University of the Philippines: a K-12 educational reform programs and the 2015 ASEAN Economic Integration. On one hand, K-12 is the result of mandated educational reform which involves shifting of the basic curriculum from 10 to 12 years. The need for K-12 stems from the need to elevate the basic foundation of Philippine Higher Education Institutions' (HEIs) graduates to be regionally and globally competitive since the Philippines remains the only country in the ASEAN region and one of the three countries (besides Djibouti and Angola) in the world with 10 years of basic education (UPSIO, 2013). On the other hand, the shift of the academic calendar to August-July from the current June-May is the University of the Philippines (UP)'s response toward its development into a regional and global university and maximizing opportunities offered by the ASEAN integration and global educational partnerships. In UP, several changes were made in line with UP President Alfredo Pascual's vision, "We must prepare our students for the workplace, so they may remain competitive…expose them to the basic tenets of entrepreneurship which is needed to spawn wealth creation…through business enterprise…towards the path of innovation."

The Department of Agribusiness Management and Entrepreneurship (DAME) recently has started to revise and incorporate entrepreneurship courses in its curricula in both the BS in Agribusiness Management and Master of Management degree programs. To complement this effort, the profiling of the entrepreneurial competencies of the University of the Philippines Los Baños (UPLB) students was included in the agenda of the Research Roadmap of DAME for 2013-2016. To jumpstart the profiling of entrepreneurial competencies of UPLB students, DAME has initiated and completed an initial entrepreneurial

profiling study on its BSABM and MM students as presented in this paper. The general objective of this study was to generate benchmark information which will serve as bases for addressing the needs of the students particularly in the development of entrepreneurship courses. Developing the entrepre-neurial values and skills of students through entrepre-neurship education requires proper orientation and motivation. Hence, there is a need to provide formal education and training for entrepreneurship (CHED, 2005).

Specifically, this study aimed to profile and determine the Personal Entrepreneurial Competencies (PEC) of BSABM and MM students. Profiling the entrepreneurial competencies of these students will enable them to assess what they need to improve to engage successfully in entrepreneurship as well as provide the necessary information needed to develop appropriate courses and training modules for these students. The study also aimed to analyze the differrences in the entrepreneurial competencies of the students and determine the critical and relevant entrepreneurial competencies. The determinants or factors affecting the personal competencies of the students were identified and analyzed. This is expected to create awareness among students of the mindset and skills of successful entrepreneurs they need to develop or to improve in order to prepare them for an entrepreneurial career.

Ⅱ. Personal Entrepreneurial Competencies (PECs)

The Personal Entrepreneurial Competencies (PECs) are the collective term used by behavioral scientists to profile the mindset and behavioral traits of entrepreneurs. In the study of McClelland (1961), as cited in Depositario et al. (2011), PECs were found to transcend culture, country, and continent. From the 14 PECs identified by McClelland which appeared to characterize the behavior of successful entrepreneurs, these were grouped later into three main clusters and merged to derive the 10 PECs: 1) opportunity seeking;

2) persistence; 3) commitment to work contract; 4) risk-taking; 5) demand for efficiency and quality; 6) goal setting; 7) information seeking; 8) systematic planning and monitoring; 9) persuasion and networking; and 10) self-confidence (Diaz, 1993). Diaz et al. (1997) considered the PECs synonymous with entrepreneurial skills as entrepreneurial skills are translated into actions by an individual and not just as traits which are passive or mere mental preoccupation. The PEC questionnaire was developed by the UP Institute of Small-Scale Industries (UP-ISSI) and was adapted from the Management Systems International (MSI) and McBer and Company (Depositario et al., 2011).

The most recent study identified was that of Depositario et al. (2011) entitled "Entrepreneurial Skill Development Needs of Potential Agri-based Techno-preneurs." The study attempted to identify the entrepreneurial traits which distinguished current techno-preneurs from potential technopreneurs in agri-based technologies. The study concluded that the lack of opportunity seeking, self-confidence, risk-taking, networking and negotiation were the PECs that need to be addressed and developed. Studies along this line, as proposed, should be pursued on continuing basis for UPLB students as it will provide initial information in the development of entrepreneurial courses for the Department of Agribusiness Management and Entre-preneurship (DAME).

There were some researchers who agree on the important contribution of entrepreneurial education for young people. A successful entrepreneur must possess a set of generic attributes, skills and behaviors like creativity, problem solving skills, and communication that are equally important in life as well as in business (de Ocampo, Bagano & Tan, 2012). In the same way, Gorman and Hanlon (1997) found that entrepreneurial characteristics can be positively influenced by educational programs. A study conducted by Abarquez (2011) on the promotion of entrepreneurial culture among young people tried to integrate entrepreneurial competencies in basic education in the Philippines. Hence, the objectives of this study to identify and

develop the entrepreneurial skills of UPLB students are very essential in the central foundation of designing and developing entrepreneurship education by DAME. Furthermore, other universities in the Philippines and the rest of the world may find its implications relevant.

Ⅲ. Methodology

The data used in this study consisted of student profiles and Personal Entrepreneurial Competency (PEC) using two sets of questionnaires. Complete enumeration was attempted on all BSABM and MM students enrolled in the second semester of Academic Year (AY) 2013-2014. To maximize probability of participation, questionnaires were administered in actual classes with the permission of professors, as well as online (URL http://form.jotform.me/form/ 40190271624447 and for the PEC Self Rating Questionnaire (http://form.jotform.me/form/4017776 5849469), through social media such as Facebook, and personal requests from students directly or through friends.

In the data analyses, dependent variables were represented by the Personal Entrepreneurial Competency (PEC) scores of the students in all 10 competencies while the independent variables were further classified into uncontrollable (demographic profile of the students which were age, number of sibling, sibling rank and sex) and controllable variables (exposure of the students to symposiums, engagement in organizations and business experience). Statistical differences among the PEC scores were tested using the Mann-Whitney U Test. In turn, the relationship or association of each independent variable with a dependent variable was tested using Spearman Rank Correlation (for metric variables namely, age, number of siblings, sibling rank and student classification) and Chi Square Test of Independence (for non-metric variables namely, sex, family business, exposure to symposiums, engagement in organization, business experience). Further analysis was conducted using ordinal logistic regression to estimate the probability that the PEC level

would be weak (Y=0), moderate (Y=1) or strong (Y=2) as a function of the identified independent variables.

3.1. Profile of the BSABM and MM Students

Of the 315 BSABM students enrolled this semester, 204 (65%) participated in the study, consisting of 44 freshmen, 39 sophomores, 61 juniors and 60 seniors. In the case of MM students, 30 participated.

As shown in Table 1, the average age of freshmen to senior students ranged from about 17 to 20 years old while the average age of MM students was 29 years. By gender, 79 (34%) were male and 155 (66%) were female. Excluding MM students, female students outnumbered male students in all classifications. In terms of sibling rank, 91 (39%) were the eldest child in their family, 49 (17%) were the youngest and 7 (3%) were an only child. A majority (35%) of the students had two siblings.

Table 1. Profile of BSABM and MM Graduate Students (Second Semester, 2013-2014).

| | Classification | | | | | | | | | | | |
	Freshmen n=44	%	Sophomore n=39	%	Junior n=60	%	Senior n=61	%	MM n=30	%	Total n=234	%
Average age	16.8		18.2		19.1		20.1		28.67			
Sex												
Male	16	36	13	33	19	32	15	25	16	53	79	34
Female	28	64	26	67	41	68	46	75	14	47	155	66
Sibling rank												
First	15	34	17	44	28	47	19	31	12	40	91	39
Second	10	23	7	18	5	8	12	20	3	10	37	16
Third	7	16	5	13	3	5	4	7	1	3	20	9
Fourth	1	2	2	5	4	7	5	8	2	7	14	6
Fifth	2	5	0	0	1	2	1	2	0	0	4	2
Sixth	0	0	1	3	1	2	18	30	1	3	21	9
Youngest	8	18	5	13	16	27	2	3	9	30	40	17
Only	1	2	2	5	2	3	0	0	2	7	7	3
No. Of siblings												
None	1	2	3	8	3	5	2	3	2	7	11	5
One	12	27	7	18	21	35	18	30	3	10	61	26
Two	13	30	17	44	21	35	18	30	14	47	83	35
Three	13	30	5	13	6	10	10	16	5	17	39	17
Four	1	2	2	5	6	10	12	20	4	13	25	11
Five and above	4	9	5	13	3	5	1	2	2	7	15	6
Symposium												
Yes	5	11	11	28	25	42	41	67	22	73	104	44
No	39	89	28	72	35	58	20	33	8	27	130	56
Organization												
Yes	8	18	18	46	33	55	33	54	24	80	116	50
No	36	82	21	54	27	45	28	46	6	20	118	50

Only 104 (44%) of the students had attended symposia and business-related trainings. A large portion of those who attended symposia belonged to higher student classifications, specifically: 22 (73%) were MM students, 41 (67%) seniors, and 25 (42%) juniors. Most of the symposia that students had participated in were business seminars and talks held at the College of Economics and Management (CEM). Outside the university, some students also attended Investment Conferences, GONEGOSYO talks and seminars, and a Department of Trade and Industry

(DTI) seminar. In terms of organizational involvement, 116 (50%) were involved in organizations, mostly junior, senior and MM students.

In total, only 47 (20%) of the students were engaged in retailing and food type business, a majority (70%) of which were sole proprietors, 23% partnerships and 6% corporations mainly composed of MM students (Table 2). A majority (76%) were not yet in business but indicated interest to engage in business in the future, while 4% were still undecided or had different plans.

Table 2. Type of Business Started by BSABM and MM Students (Second Semester, 2013-2014).

	F		SO		JR		SR		MM		TOTAL	
Type of business	n=3	%	n=8	%	n=9	%	n=19	%	n=8	%	n=47	%
Sole proprietorship	2	67	7	88	7	78	12	63	5	63	33	70
Partnership	1	33	0	0	2	22	7	37	1	13	11	23
Corporation	0	0	1	13	0	0	0	0	2	25	3	6

Table 3 summarizes the reasons of 178 students who wanted to have a business in the future. In general, among the seven reasons, financial independence (83%), applying skills and using resources (60%) and passion (54%) are the top reasons of the students for why they would want to engage in the business. The least selected reason was inheritance (8%) mainly due to the fact these students have other business interests.

Table 3. Students' Reasons for Venturing into Business in the Future.

	Classification											
Reasons	F		SO		JR		SR		MM		TOTAL	
	n=38	%	n=31	%	n=47	%	n=41	%	n=21	%	n=178	%
Financial independence	32	84	24	77	39	83	35	85	17	81	147	83
Passion	25	66	15	48	21	45	26	63	10	48	97	54
Inheritance	6	16	3	10	5	11	1	2	0	0	15	8
Opportunity and market demand	17	45	9	29	18	38	20	49	9	43	73	41
I want to be my own boss	14	37	8	26	23	49	23	56	9	43	77	43
Use resources skills and expertise	21	55	17	55	27	57	28	68	14	67	107	60
Provide employment	20	53	12	39	20	43	27	66	9	43	88	49
Others	0	0	1	3	3	6	0	0	4	19	8	4

Furthermore, of these 178 students, 59% had plans to engage in either food and/or a retailing business. Other kinds of business listed by students were manufacturing, service and other forms of business particularly in farming, livestock raising, landscaping and software development (Table 4).

Table 4. Type of Business that BSABM and MM Students Want to Pursue.

	Classification											
Kind of business	F		SO		JR		SR		MM		TOTAL	
	n=38	%	n=31	%	n=47	%	n=41	%	n=21	%	n=178	%
Food/hospitality	20	53	19	59	32	70	23	55	11	52	105	59
Retailing/selling	21	55	17	53	28	61	12	20	6	29	84	47
Manufacturing	8	21	7	22	14	30	12	20	1	5	42	24
Service/repair	4	11	4	13	11	24	8	13	5	24	32	18
Others	0	0	2	6	6	13	1	2	3	14	12	7

3.2. Personal Entrepreneurial Competencies of BSABM and MM Students

To test the entrepreneurial competencies of BS Agribusiness students and MM students, the Personal Entrepreneurial Competency (PEC) analysis tool adapted from the UP Diliman – Institute of Small Scale Industries (UP-ISSI) was utilized. Mean PEC scores of students were then computed using the equation provided by UP-ISSI. Scores that were less than 15 were considered weak, 16 to 18 were moderate and 19 and above were classified strong. This range was also used in the study done by Depositario et al. (2011), and Belen (2009) and Cruz (2005) as cited in Depositario et al. (2011).

As shown in Table 5, entrepreneurial competencies such as opportunity seeking, persistence, commitment to work contract, demand for quality and efficiency and risk taking were found to be moderate for all student classifications except freshman students, who were found to be weak in terms of opportunity seeking competency. With regards to goal setting, freshman and sophomore student scores were moderate while junior, senior, and MM student scores were strong. In terms of information seeking competency, freshman and MM students showed strong scores. The remainning student classifications reflected moderate scores in terms of information seeking competency. In terms of persuasion and networking competencies, all student classifications produced weak scores except for MM students, which produced moderate scores. As expected, the analysis of the PEC of MM students in the different competencies of self-confidence, persuasion, and networking were notably higher than the BSABM students.

Table 5. Personal Entrepreneurial Competencies of BSABM and MM Students.

Competencies	Classification				
	F n=44	SO n=39	JR n=60	SR n=61	MM n=204
Opportunity seeking	**15.91** Weak	16.31 Moderate	16.93 Moderate	16.79 Moderate	**17.50** Moderate
Persistence	17.86 Moderate	**17.21** Moderate	18.03 Moderate	18.00 Moderate	**18.97** Moderate
Commitment to the work contract	17.59 Moderate	**17.92** Moderate	17.47 Moderate	**17.39** Moderate	17.87 Moderate
Demand for quality and efficiency	**17.59** Moderate	**16.64** Moderate	16.88 Moderate	16.97 Moderate	17.53 Moderate
Risk taking	**17.32** Moderate	16.97 Moderate	**17.32** Moderate	16.72 Moderate	**16.67** Moderate
Goal setting	18.68 Moderate	**18.51** Moderate	19.30 Strong	19.38 Strong	**19.63** Strong
Information seeking	19.07 Strong	**18.18** Moderate	18.75 Moderate	18.61 Moderate	**19.67** Strong
Systematic planning and monitoring	18.18 Moderate	**17.59** Moderate	17.65 Moderate	17.98 Moderate	**18.70** Moderate
Persuasion and Networking	15.55 Weak	**15.36** Weak	15.75 Weak	15.39 Weak	**16.30** Moderate
Self Confidence	16.23 Moderate	**16.13** Moderate	16.78 Moderate	16.34 Moderate	**18.40** Moderate

Note: **Highest** Lowest.

In general, MM students obtained higher scores than BSABM students in seven competencies, particularly in opportunity seeking, persistence, goal setting, information seeking, systematic planning and monitoring, persuasion and networking, and self-confidence with the following average PEC scores of 17.5, 18.97, 19.63, 18.7, 16.30 and 18.4, respectively.

3.3. Determination of the Significant Differences in the Mean PEC Scores of BSABM and MM Students

To test if there were significant differences in the seven highest mean PEC scores of the students as stated above, the Mann Whitney U-Test was applied.

The mean PEC score of all BSABM and MM student respondents were ranked from highest to lowest. The student classification that had the highest ranking was compared to the student classification with the second highest ranking. A significant p-value indicates two classifications having significantly different ranks. Conversely, an insignificant p-value indicates same ranking or no significant difference in ranks.

As shown in Table 6, in terms of opportunity seeking competency, MM students had the highest PEC score and were found to be significantly different from the second highest PEC score belonging to the BSABM junior students. Thus, difference in rank was established between MM students and BSABM junior students. This can be explained by the fact that MM

students had more business or work experience. Moreover, their maturity, knowledge and experience enabled MM students to be more competent in taking advantage of business opportunities available to them. This is consistent with the findings of Depositario, Aquino, and Feliciano (2011) where they cited that opportunities, especially business-related, were still not encountered by undergraduate students and that seizing and acting on business opportunities were not yet prioritized by undergraduate students. In the case of junior, senior, and sophomore BSABM students, although they had different mean PEC scores, these were not statistically significant and were concluded to have the same rank. Freshman BSABM students had the lowest PEC scores and were found to be significantly different from the PEC scores of other BSABM student classifications.

In terms of persistence competency, MM students also had the highest PEC score and were found significantly different from the next highest score belonging to junior BSABM students. Likewise, the freshman, sophomore, and senior BSABM student PEC scores were found to be not significantly different from the PEC scores of junior BSABM students. Hence, the resulting analysis showed that the PEC scores were ranked the same. According to SERDEF (1997), persistence is the ability of not giving up easily when confronted with obstacles. One is not easily discouraged at early signs of failure. MM students were expected to be more persistent and determined to achieve their goals having more adult responsibilities especially those MM students with their own families depending on them.

Contrary to expectations, in terms of demand for quality and efficiency, freshman BSABM students had the highest ranking in mean PEC scores. Nevertheless, this did not differ significantly from MM students who were the second highest in ranking. Moreover, the PEC scores of the senior, junior, and sophomore BSABM students were not significantly different.

In terms of information seeking competency, the MM students still had the highest ranking in mean PEC scores but were found not significantly different from the freshman BSABM students who were the next highest ranked student group in mean PEC score. Compared to junior BSABM students, however, there was a significant difference in the mean PEC scores and hence, they had different ranking. No significant difference was noted between junior, senior, and sophomore BSABM students' ranking in mean PEC scores as well. According to SERDEF (1997), as cited in Depositario et al. (2011), information seeking is the continuous finding of relevant information regarding the market, clients, suppliers and competitors. MM students were expected to seek more relevant business information than junior, senior, and sophomore BSABM students since they were more exposed to the real world of business or had been already exposed to actual business situations. With regards to freshman BSABM students, they were also more information seeking than the remaining three BSABM student classifications. Since they were ushered into a new school environment and culture in the University, seeking information in terms of studying, exploration, and experimentation is really important to them.

Similarly, MM students and freshman BSABM students turned out to have the highest PEC scores in systematic planning and monitoring, which were not significantly different. The next highest rank in mean PEC scores was that of the senior BSABM students which turned out to be significantly different. The mean PEC scores of senior, junior and sophomore BSABM students were not significantly different.

As in systematic planning and monitoring, the same results showed in the case of persuasion and networking. The MM and freshman BSABM students had the highest mean PEC scores, which were not found to be significantly different. Interesting to note, however, is that the mean PEC scores of freshman and junior BSABM students were not significantly different while a significant difference was found between MM and senior BSABM students. Moreover, the difference in the PEC scores of senior and sophomore BSABM students were also found to be significant.

In the case of self-confidence, the mean PEC scores of MM students significantly differed from the next highest mean PEC score belonging to the junior BSABM students. In turn, there were no significant differences among the junior, senior, sophomore and freshman BSABM students. Self-confidence, according to Depositario, Aquino, and Feliciano (2011),

means having a strong belief in one's own ability to complete a difficult task or to meet a challenge. Since the MM students were more mature and had more experience in dealing with actual business problems, they were expected to be more confident than the BSABM students.

Table 6. Significant Differences Among Seven Highest Mean PEC Scores of All Classifications Based on Mann-Whitney U Test.

Competency	Classification	Mean Rating	P-value	Rankings
	GRADUATE	17.50		1
	JUNIOR	16.93	0.077*	2
Opportunity Seeking	SENIOR	16.79	0.588	2
	SOPHOMORE	16.31	0.217	2
	FRESHMEN	15.91	0.055*	3
	GRADUATE	18.97		1
	JUNIOR	18.03	0.034**	2
Persistence	SENIOR	18.00	0.842	2
	FRESHMEN	17.86	0.77	2
	SOPHOMORE	17.21	0.372	2
	FRESHMEN	17.59		1
Demand for Quality	GRADUATE	17.53	0.964	1
and Efficiency	SENIOR	16.97	0.131	1
	JUNIOR	16.88	0.059*	2
	SOPHOMORE	16.64	0.695	2
	GRADUATE	19.67		1
	FRESHMEN	19.07	0.51	1
Information Seeking	JUNIOR	18.75	0.028**	2
	SENIOR	18.61	0.693	2
	SOPHOMORE	18.18	0.439	2
	GRADUATE	18.70		1
Systematic Planning	FRESHMEN	18.18	0.446	1
and Monitoring	SENIOR	17.98	0.089**	2
	JUNIOR	17.65	0.446	2
	SOPHOMORE	17.59	0.465	2
	GRADUATE	16.30		1
Persuasion	JUNIOR	15.75	0.187	1
and Networking	FRESHMEN	15.55	0.138	1
	SENIOR	15.39	0.008***	2
	SOPHOMORE	15.36	0.065*	3
	GRADUATE	18.40		1
	JUNIOR	16.78	0.001***	2
Self Confidence	SENIOR	16.34	0.263	2
	FRESHMEN	16.23	0.501	2
	SOPHOMORE	16.13	0.534	2

Note: *** Significant at 1% level, **Significant at 5% level, * Significant at 10% level.

3.4. Determination of the Relationship between the Independent Variable and the Personal Entrepreneurial Competency of BSABM and MM Students

3.4.1. Spearman Rank Correlation Test

The Spearman Rank Correlation is a non-parametric alternative to the linear correlation coefficient that tests if there is an association between two variables. A correlation value equals to 1 indicated that y increases as x increases and a correlation value equal to –1 indicated that y

decreases as x increases. The strength of correlation depends on the following ranges: 0.00-0.19 very weak; 0.20-0.39 weak; 0.40-0.59 moderate; 0.60-0.79 strong; and 0.80-1.0 very strong relationship.

As shown in Table 7, the student classification was significantly associated with opportunity seeking (p-value 0.00636) at the 1% level of significance. However, the strength of correlation was relatively weak since it was only 0.17789. Since the correlation was positive, it meant that as a student obtained another year level, his opportunity seeking skills was enhanced. There was a general increasing trend in opportunity seeking from undergraduate freshman student level to graduate student level. This can be attributed to some extent to the impact of the efforts of the DAME Faculty in developing the opportunity seeking skills of the students.

At the 5% significance level, the student classification was also found to be significantly correlated with self-confidence with a p value of 0.1465. This also meant that the self-confidence of freshmen developed as they became upperclassmen

and graduate students. Maturity, experience, and achievement might explain the increasing trend in self-confidence.

Age was found to be significantly associated with opportunity seeking (p value=0.00275) and self-confidence (p value=0.00371). However, the correlation was found to be weak since the correlation values in the two competencies were only 0.19492 and 0.18902, respectively. Since the correlations were both positive, these indicated that as the individual gets older, one became more opportunity seeking and more confident.

At the 5% level of significance, age was also found to be correlated with persistence (0.01235) and goal setting (0.01619). However, the correlations were weak given the low correlation values of 0.10974 and 0.15706, respectively. Positive correlation in both competencies meant that as an individual matured, he became more persistent and his goal setting abilities became better. In addition, at the 5% significance level, the number of siblings and sibling rank were not significantly associated with the entrepreneurial skills of the students.

Table 7. Results of the Spearman Rank Correlation Test of BSABM & MM Graduate Students in UPLB.

PEC	Classification		Age		Sibling Rank	
	Correlation	P-value	Correlation	P-value	Correlation	P-value
OS	0.17789	0.00636***	0.19492	0.00275***	-0.0368	0.58305
PER	0.12445	0.05731*	0.16333	0.01235**	-0.0683	0.30767
CWC	0.02628	0.68921	0.05771	0.37949	-0.1265	0.05824*
DQE	0.00605	0.92671	0.10974	0.09397*	0.02772	0.67917
RT	-0.0932	0.15546	-0.0484	0.461	-0.0612	0.36088
GS	0.12674	0.05285*	0.15706	0.01619**	-0.0626	0.34984
IS	0.03782	0.56488	0.06163	0.34793	-0.0489	0.46539
SPM	0.05339	0.41624	0.00946	0.88553	-0.1209	0.07032*
PN	0.03948	0.54786	0.06038	0.35782	-0.0678	0.31118
SC	0.14645	0.02506**	0.18902	0.00371***	-0.0723	0.28031

Notes: 1. Competencies: OS-Opportunity Seeking, PER: Persistence, CWC: Commitment to Work Contract, DQE: Demand for Quality and Efficiency, RT: Risk Taking, GS: Goal Setting, IS: Information Seeking, SPM: Systematic Planning and Monitoring, PN: Persuasion and Networking, SC: Self-Confidence.
2. *** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level.

3.4.2. Chi-Square Test of Independence

For qualitative factors such as sex/gender, symposium, membership in an organization, own business

and family business, a Chi-square Test of Independence was applied to test if these factors have significant association with the entrepreneurial competencies of the students. To determine if the significant

association between the variables are strong, moderate or weak, the values of the phi coefficient, contingency coefficient and Cramer's V were estimated. Coefficient < 0.1 indicates weak association, 0.1 to 0.3 for moderate and > 0.3 indicates strong association.

As shown in Table 8, there were significant associations between the categorical factors (sex/gender, symposium, membership to organization, own business and family business) and the personal entrepreneurial competencies of all BSABM students, including the MM students. Sex/gender was found to be significantly associated with self-confidence (p-value=0.077) at a 10% level of significance. The association was considered moderate since the computed Cramer's V coefficient was 0.15045. This showed that sex/gender moderately affected the self-confidence of an individual.

Symposium attendance was also found to be significantly associated with opportunity seeking (p value = 0.003) and systematic planning and monitoring (p value=0.003) at the 1% significance level. However, the association was only moderate given the Cramer's V coefficient of only 0.2157 and 0.22026, respectively.

Membership in an organization was found significantly associated with opportunity seeking (p value = 0.001) at the 1% significance level and with persistence (p value=0.026) at the 5% significance level. These indicate that membership in an organization affected the opportunity seeking skills and persistence of an individual to a certain extent.

It is interesting to note that owning a business was not associated with any competencies. However, family business was found to be significantly related with information seeking (p value=0.020) and the association was found to be moderate (Cramer's V was only 0.1795).

Table 8. Results of the Chi Square Test of Independence of the BSABM& MM Graduate Students of UPLB.

Competencies	Factors				
	Sex p-value	Symposium p-value	Organization p-value	Own business p-value	Family Business p-value
Opportunity Seeking	0.312	0.003***	0.001***	0.692	0.104
Persistence	0.702	0.723	0.026**	0.745	0.960
Commitment to Work Contract	0.346	0.056*	0.984	0.800	0.722
Information Seeking	0.264	0.111	0.617	0.508	0.020**
Systematic Planning And Monitoring	0.160	0.003***	0.809	0.600	0.192
Self-Confidence	0.077*	0.374	0.095	0.506	0.861

Note: *** Significant at 1% level, **Significant at 5% level, * Significant at 10% level.

3.4.3. Ordinal Logistic Regression

Several tests were conducted. However, the obtained results were contrary to expectation. In the final analysis, the following results are presented.

The PEC scores were categorized into three groups: Weak (for PEC scores below 15), Moderate (16-18) and Strong (19-25). The predictor variables used were classification, age, sex, exposure to symposium, number of siblings, sibling rank, membership in an organization, having a family business, and owning a business. Correlation analysis was conducted to test whether there were predictor variables that were highly correlated. It was found that age and classification (r = 0.701; p = 0.00) and number of siblings and sibling order (r = 0.640; p= 0.00) had strong positive relationship, thus, age and number of siblings were dropped from the list of predictor variables.

Then, the best subsets function of MINITAB16 was used to determine which combination of variables would be the best predictors for each personal entrepreneurial competency level. The best subset was determined using the decision rule: (Mallows Cp) ~ (Number of variables + 1). The logit model was then determined using the ordinal logistic regression function of MINITAB 16. Tables 9a to 9i show the results of the ordinal logistic regression analysis.

The results showed that MM graduate students had lower opportunity seeking, persistence, commitment to work contract, goal setting, information seeking, and systematic planning and monitoring competency levels than undergraduate BSABM students. This could be explained by the fact that 80% of the MM student respondents were employees.

Students who attended symposium had lower opportunity seeking, commitment to work contract, and systematic planning and monitoring competency levels than those who did not attend any symposium. This could be explained by the fact that the attendance of students to symposium was merely in compliance with class requirements rather than their personal initiative.

Students who were affiliated with organizations had a lower opportunity seeking competency level. This could be attributed to the nature of the organizations where they belong, which were mainly academic- and civic-oriented organizations.

Students with family business had lower opportunity seeking, information seeking, systematic planning and monitoring, and risk taking competency levels than those who did not have family business. This could be explained by the fact that they already have

their own family business and their immediate concern is to run it. Additionally, since most family businesses are small- and medium-sized businesses, families who operated them do not practice formal planning and business monitoring methods. Those with family business were focused on operations rather than on strategic growth direction. In general, families who owned businesses are more conservative towards risk, such that they do not want to disturb the business status quo; they are already satisfied as long as they are earning income sufficient to support their family needs and lifestyle.

Students who have and who had their own business had higher information seeking, demand quality and efficiency, and systematic planning and monitoring competency levels. The odds of having "strong" information seeking and systematic planning and monitoring competency levels for students who have and who had their own business were 2.01 times greater than those who did not have any business at all. The odds of having a "strong" demand for quality and efficiency competency level for students who have and who had their own business were 1.74 times greater than those who did not have any business at all.

Male students had lower persuasion and networking competency levels compared to female students. The odds of having "strong" persuasion and networking competency levels for male students were 0.54 times lower than female students. This result was consistent with the findings of Caliper and Aurora (n.d.), which indicated that women leaders were more assertive and persuasive than male leaders.

Table 9. Coefficients and (Odds Ratios) of Opportunity Seeking Competency Level and the Independent Variables.

PEC	Classifi-cation	Symposium	Affiliation	Family Business
Opportunity Seeking	Graduate Students -0.904327* (0.40)	-0.645466** (0.56)	-0.581026** (0.56)	-0.585482** (0.56)

Table 10. Coefficients and (Odds Ratios) of Persistence Competency Level and the Independent Variables.

PEC	Sex
Persistence	Graduate Students -1.06029** (0.35)

Table 11. Coefficients and (Odds Ratios) of Commitment to Work Contract Competency Level and the Independent Variables.

PEC	Sex	Symposium
Commitment to Work Contract	Graduate Students -0.878865* (0.40)	-0.672832** (0.51)

Table 12. Coefficients and (Odds Ratios) of Goal Setting Competency Level and the Independent Variables.

PEC	Sex
Goal Setting	Graduate Students -1.41113** (0.24)

Table 13. Coefficients and (Odds Ratios) of Information Seeking Competency Level and the Independent Variables

PEC	Sex	Family Business	Own Business
Information Seeking	Graduate Students -0.924886* (0.40)	-1.10288*** (0.33)	0.697042** (2.01)

Table 14. Coefficients and (Odds Ratios) of Systematic Planning and Monitoring Competency Level and the Independent Variables.

PEC	Sex	Symposium	Family Business	Own Business
Systematic Planning and Monitoring	Graduate Students -0.934627* (0.39)	-0.739537** (0.48)	-0.583772** (0.56)	0.697079** (2.01)

Table 15. Coefficients and (Odds Ratios) of Persuasion and Networking Competency Level and the Independent Variables.

PEC	Sex
Persuasion and Networking	-0.920075* (0.40)

Table 16. Coefficients and (Odds Ratios) of Demand for Quality and Efficiency Competency Level and the Independent Variables.

PEC	Family Business	Own Business
Demand for Quality and Efficiency	-0.848069*** (0.43)	0.556195* (1.74)

Table 17. Coefficients and (Odds Ratios) of Risk Taking Competency Level and the Independent Variables.

PEC	Family Business
Risk Taking	-0.576245** (0.56)

Ⅳ. Conclusion and Recommendation

The Personal Entrepreneurial Competencies (PEC) results showed that in general, BS Agribusiness Management (BSABM) students excelled in three (3) entrepreneurial competencies, namely: goal setting, information seeking, and systematic planning and monitoring. These could be attributed to the culture of the University of the Philippines and to the Department of Agribusiness Management and Entrepreneurship (DAME) degree programs and student training provided for the students on how to set and define goals and strategically plan to achieve personal and business success. Moreover, the DAME faculty teach students to continuously seek relevant information regarding the market, industry, suppliers, and competitors. PEC ratings also revealed that BSABM students had low competency levels in terms of persuasion and networking and in self-confidence. Master of Management (MM) students were also found to have low competency levels in persuasion and networking besides having low competency levels also in risk taking. These areas of competency really need to be addressed and developed.

The average mean PEC scores revealed that MM students had higher competency levels than BSABM students in nine (9) entrepreneurial competencies, namely: opportunity seeking, persistence, commitment to work contract, demand for quality and efficiency,

goal setting, information seeking, systematic planning and monitoring, persuasion and networking, and self-confidence. However, BSABM students were found to have higher competency levels than MM students in terms of risk taking. This indicated that younger people were more aggressive than their older counterparts.

To test the significant difference in the mean PEC scores of the students, the Mann-Whitney U Test was conducted. It was revealed that mean PEC scores of freshman, sophomore, junior, senior BSABM students and MM students were significantly different in terms of opportunity seeking, persistence, demand for quality and efficiency, information seeking, systematic planning and monitoring, persuasion and networking and self-confidence.

In the Spearman Rank Correlation, results showed that student classifications were significantly associated with opportunity seeking, self-confidence and persistence. Nevertheless, the correlations were all weak. With regards to age, it was revealed that it was significantly correlated with opportunity seeking, persistence, goal setting and self-confidence. However, similar to the results in student classification, all the correlations were found to be weak. In addition, the number of siblings and sibling rank were not significantly associated with the entrepreneurial skills of the students.

Based on the Chi-Square Test of Independence, exposure to symposiums was significantly correlated with opportunity seeking and information seeking. Membership in student organizations was found to be significantly associated with opportunity seeking and persistence. Additionally, having a family business was also found to be significantly related to information seeking.

Based on the logistic regression analysis, sex/gender was found to be a significant predictor variable for persuasion and networking competency level and owning a business as a predictor for demand for quality and efficiency, information seeking and persuasion and networking competencies.

Given the above benchmark information, DAME should focus on upgrading the education of BSABM and MM students by redesigning its existing degree program curricula to enhance the entrepreneurial preparedness and competencies of students to meet the needs of the modern workplace and the competitive world of business in general. In particular, there is a need to advance the skills of the students in different areas of communication, presentation, negotiation, and networking.

Class conduct should encourage more participation in recitation and reporting. Groupings and team building activities might also be helpful in improving the networking skills and the self-confidence of the students. The following are also recommended to further unleash the entrepreneurial spirit and skills of the students:

Ⅴ. Regular Exposure of Students to Symposia, Fora, and Business Training

The department should hold more symposia, fora and training related to business. Agribusiness managers and entrepreneurs should be invited to share success and failure stories to strengthen the passion of the students toward entrepreneurship. Symposia and fora also open a lot of opportunities, new ideas and learning opportunities that students can take advantage of.

5.1. Establish and Intensify Industry and Alumni Linkages

The department should initiate, build, and promote linkages with alumni and industry players both in the private and public sectors. Partnerships and collaborations should be promoted to establish strong public and private networks that will be beneficial for instruction research, and extension.

5.1.1. Offer Technology-Based Courses

Technology-based courses like agri-biotech and food technology courses should also be offered to

make the students more competitive entrepreneurs and innovators. In current times, technology plays a central role in the birth, growth, and survival of modern businesses. For this reason, students must learn and be able to use innovation to their advantage.

5.1.2. Domestic and International Exposure and Educational Trips

Exposure and educational trips are also essential in developing the entrepreneurial competencies of the students. These methods of educating students allow them to have a broader awareness of the business environment where they will be competing eventually. Additionally, it will give them the opportunity to observe the actual business practices and methods of entrepreneurs as well as develop their business networks.

1.5.3. Institute Apprenticeship Studies

In the existing curricula, apprenticeship study is only an option as a Special Problem study. Feedback from students who opted to conduct this for their special problem was very positive and several even landed jobs in the companies they studied. It need not be a full blown apprenticeship study, but students should have a similar exposure to a certain extent.

5.2. Entrepreneurship Training and Engaging in Actual Business of Professors and Instructors

To achieve the goals of producing successful entrepreneurs that will become the backbone of the Philippine economy, DAME Professors and Instructors should be allowed to engage in actual business operations so they can share not only conceptual knowledge but practical wisdom to build their credibility and to better equip them to teach entrepreneurship courses. Additionally, support for entrepreneurship trainings and exposure trips for DAME faculty should be made available.

5.3. Enrollment in Entrepreneurs Program (E2E Program)

It is now high time to review and redesign the existing degree program of DAME to propose two program tracks: 1) a management track; and 2) an entrepreneurship track under the BSABM curriculum. This is also consistent with the commitment of UP President Pascual in the promotion of entrepreneurship. The entrepreneurship program track will provide opportunities for the students to become successful in business by mastering on three important areas: self, enterprise, and environment. It will use a holistic and experiential learning approach in developing and managing an enterprise. Moreover, the program will promote hands-on and actual application of the skills learned through actual experience.

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Government Restrictions and the Online Shopping Industry

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ABSTRACT

China and Korea must install Active-X in order to buy something online. Thus, the Government is trying to eliminate regulations for the economic revitalization of the online industry. Do these government regulations have any impact on the Online Industry? The subject of this paper is to discuss the various economic variables that will affect empirical analysis. As a result, government regulation of the online shopping industry is growing dramatically. The growth of online shopping on the factors that affect a significant positive effect on per capita income growth variables and computer penetration and internet penetration, respectively. Industrial large negative affect online is 'Unemployment' with a -0.472454 correlation coefficient that shows a strong negative relationship. The Employment Rate is also very strong as the correlation coefficient is −0.404007, which can be seen as a negative correlation.

Ⅰ. Introduction

On March 21, 2014, President Park declared Korea's intention to get rid of "Regulations and The War." YTN reported that government regulations for various industries had increased to 16,000. Solving these regulations would cost more than 10 trillion won in investment in 2018, increasing employment growth to more than 60,000. The government, which regulates auto-tuning and the car modification industry, alone will reach 100 trillion won Ministry official said.

The sensational popularity in China of "From the Stars You" of Kim Soo-Hyun and Jeon, for those who tried to buy clothes must have a certificate to install an ActiveX security program. This eliminates inconvenience and the party government has declared

war and this will be regulated. President Park Geun-hye said regulations are a sin. The forefront of deregulation has a rough representation. One of the outcomes of such a certificate is that to shop online or buy one must regulate both foreign and domestic customers. On March 22, 2014, the government decided to abolish. As mentioned earlier, you must install a security program like ActiveX, which government has also decided to regulate. Thus, recent government regulations will eliminate the economic revitalization of the online industry in Korea.

In this paper, the online shopping industry, regulations and economic study of the correlation between variables is performed. This paper presents T-commerce, M-commerce, E-commerce, as the limited discussion of M-commerce has become more active through the popularity of smart phones. In young people from 20 to 30, a mobile phone addiction sees

smartphones used around the clock. Thus, M-commerce has greatly increased with smartphones as a high growth potential field. There are three traditional factors of production: economics, land, labor, and capital, respectively. Recently, however, a fourth factor of production, the mobile and the internet industry, has emerged in the modern economy. Futures brokerage firms belonging to small scale domestic securities have the highest market share in raising future generations in how to look at the size of the company, rather than focusing on how online and mobile business done. Our future can be seen immediately in the mobile era. Offline stores currently in the market and big companies are also operating at the same time; the online market has growth. Consumers also used, but also off-line, using the trend line at the same time the increase at a faster rate.

E-Mart and Lotte Mart, two mammoth distribution companies have been operating at the same time in the online market. Many do not have time to come to the market directly. Dual-income couples pay a little profusely at mart stores to purchase products online, such as the payment for the order to be put through.

For E-commerce in the home or business, we are using the internet access to online ordering and payment. In recent years, because of the rapid spread of smart phones, E-commerce is lagging behind in the mobile industry. The reason is that the Internet and PC penetration has already saturated the market. T-commerce and e-commerce will broadcast using only the advantages. Recent Ole SK Broadband TV and a bi-directional IPTV are used to gradually increase the proportion of value-added services. Determining the scope of the online shopping industry law " Consumer Protection in Electronic Commerce Act" has yet to be .

Internet shopping continues to grow each year by two-digit numbers, but the print media, newspaper and magazine circulation is declining.

Electronic newspaper is declining due to activation. As we saw earlier, Samsung's Galaxy tablet PC, Apple's electronic media, and the spread of smartphones are rapidly expanding. In the case of IPTV, broadcasts are possible under the influence of two-way transmissions.

The home shopping industry is makes expanding economies more difficult. The domestic and CJ 2013 GS Home shopping sales as compared to last year have increased significantly.

This paper wants to study the government's online shopping industry palpable legal regulations compared to existing regulations, related theories and integrated overall analysis. The popularity of online shopping problems and the side effects of the online shopping industry come from many places. One reason is that things such as photos and videos are selected. The most common issues are things that do not involve sending money, but rather create false hype about a product and other issues, such as fraud. We call it incomplete information or information gaps.

The Government must prevent these side effects in order to expand and develop the online industry. Therefore, many legislative and regulatory policies are to be implemented. These regulations are not only in our country but others including the United States, Japan, China and Europe.

Shopping online from the supplier's perspective, these government regulations hinder the development of the Internet industry. In the online industry, the success or failure of a product can also be seen quickly. The growth strategy for Korea is viewed all over the world, and such new products and new movies may be viewed as test cases.

All of this is necessary for the government's sale of nurturing and supportive position. Congressional legislation and government regulations inhibit the side effects, and can create an even better new economy. The online industry and government regulations and legislation, while watching content in future, will want to show the direction of online industry.

Ⅱ. Literature Review

Choe Seong-rak (2006) asked if regulation was required online. Government regulation of the online industry is to protect consumers and online industry for the purposes of sustainable development. The first of

the government's policy objectives for the development of the online industry is to help company morale contribute to sustainable industrial development. The second is intended for the protection of consumers and online shopping companies smoothly solve problems. To solve this problem, the government enacted e-commerce consumer protection laws in 2002.

Regulatory features of the laws include people and goods available directly online without looking for online purchase or payment industry characteristics as the intention is to purchase offline; face-to-face transactions occur in the differently. This is the case before Samsung and Nokia, as mobile telecommunications, including telecommunications and e-commerce, have strong and remarkable growth, existing regulatory problems hinder the industry and bring atrophy. Online shopping is an online space where industry regulation does not see the good in people and situations that occur in structural problems.

Lee Jin-seok (2013) analyzed regulated business activities' impact on firm performance from various regulatory reviews of studies on the general policy from research centers. The impact of various government regulations on corporate performance may aid in future policy direction. Overall, the governmental regulations that affect businesses were classified into eight kinds.

Bae Ku-kin (2002), said since 1995, the popularity of the Internet has increased, and online government intervention to solve problems and regulations should be strengthened.

The Korean government, with the IMF in 1998, began to engage in development of the IT industry for home PC penetration and to begin increasing the supply of internet access. Yuk Seong-chaek wrote that President Kim Dae-jung claimed this was one of the alternatives for the IMF in order to overcome current IT limitations, where PC penetration in the country and the world for the internet had been reached. The rapid spread of the Internet led to the expansion of online social influences, followed by a number of serious social problems. Celebrities, suicide attacks and accusations were seen on the Internet, indicating serious social problems.

Bae Mig-yeong's (2004) position paper has argued that regulation buyer's protections in e-commerce should be undertaken. He notes of buyer protection trends in other countries through introduced legislation, and argues for consumer protection.

Wu Guang-ming (2003) published a study of e-commerce between countries with unrestricted international access open to anyone. He considered the characteristics of openness, consumer protection and development of e-commerce. He argued that balanced government regulations are needed and is only concerned with how features and analysis of the entire online industry do not have adequate limitations.

Ⅲ. Research Model

The factors affecting the online shopping industry and model of analysis were developed for a simple growth model of technological progress.

Many variables affect the online shopping industry as a whole: internet penetration, economic growth, per capita income, the current account balance, and the so on. A multiple linear regression model was made using the equation below. However, using the computer penetration rate of economic growth, the unemployment rate compared to the same period in the previous year, such growth was simply to show that the model was compared with the two built.

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 \ldots \beta n X n,$$

Model 1:
Y = F (R, I, r, y, L, U, P, C,)
Y: Online market size,
R: Government regulation (Regulations),
P: Current account balance (Profit)
I: Internet penetration (Internet),
r: Economic growth, (Rate)
y: 1 per capita income (Personal yield)
U: Unemployment rate (Unemployment rate)

C: Computer supply (Computer)

E: Technological progress and the efficiency of
   labor (Efficiency)

Online Shopping Industry = function (Per Capita income, economic growth, manufacturing sector average utilization rate, unemployment rate, employment rate, consumer price fluctuations, current account, internet usage, number of internet users) + dummy variables.

The online shopping industry is the independent variable and the dependent variables are per capita income, economic growth, manufacturing sector average capacity utilization rate, unemployment rate, employment rate, consumer price fluctuations, current account, number of internet users and internet usage. The regression analysis on the online shopping industry is influenced by the independent variables. Each send and receive a variable correlated to each other between any verified. As mentioned earlier, in the middle, compared to the previous year, except for the variable that represents the simply the actual value of the variable, is shown to have made a second model. The two models were compared with each other, and the result was analyzed.

Model 2:

$Y = F(y, L, U, P,)$

Online industry = function (per capita income, current account, number of internet users)

Government regulations affecting the online industry and government regulation before and after were compared to examine whether any effects were found. As before, the government's public certificates required, such as Active-X installation duties following government regulation of the online industry, the growth rate was compared to the before and after.

Ⅳ. Data and Statistics

The online shopping industry has maintained an average annual growth of 17.3% through 2013, and the market is forecast to be about 38 trillion won. In 2012, due to the duration of the European financial crisis, there was sluggish growth in the first half but the second half was expected to see a rise in the growth rate. The economy for stores based online will be more difficult. Online shopping industry government regulations, national income, real economic growth, unemployment, current account balance, internet penetration, and penetration of computer relationships were examined. The market size and growth rate of the online shopping industry have a myriad of other factors that affect the industry.

This is assumed to have a significant impact on government regulations, Korea's internet usage, economic growth, per capita income, population trends, unemployment, and external factors such as household penetration of computers (Table 1). Online Shopping Industry market size and key variables are as follows. The market size of the online shopping industry in 2001 was about 3,470 billion won and 34.0682 trillion won in 2012, indicating that it has grown significantly.

By 2012, it had grown by about 10.17 times. 2002 saw a whopping 80.2% increase from 2001 compared to 2004, with significant growth of 10.1%, but the growth stopped. In 2002, the economy grew by 7.2% for year-over-year growth. In 2009, with the impact of the global financial crisis, it grew a mere 0.3%. Unemployment statistics are up to 4.0% from 3.2%; the difference is not big. The average unemployment rate in the country compared to the United States and Europe was relatively low. Based on March 2014, the U.S. unemployment rate was 6.7%. One reason was that job parameters were reduced, many enlisted in the Army at age 20, and part-time employment and temporary workers are relatively high at the time such estimates were due. Unemployment statistics come from the question, "Last week, did you submit a job application?" "Did not submit" unemployment statistics and job responses do not count at all because they are considered discouraged workers.

In 2008 for Korea, the current account was 3.1 billion dollars. In 2012, at 43.1 billion U.S. dollars, this has grown significantly. Korean trade (exports +

imports) accounted for 82% of the total economy. During the global financial crisis it was very low. However, as the financial crisis is resolved, the current balance is growing greater than in other countries.

Ⅴ. The Empirical Results

The unemployment rate, the growth of the online shopping industry, internet penetration, per capita income, and household computer penetration rate had a relatively greater impact than other factors. Government regulations, on the other hand, show industrial growth at a significantly lower level.

5.1. Analysis of the Correlation Coefficient

Online shopping is the most influential industry in per capita income. Cyber shopping and per capita income have a correlation coefficient of 0.985333, a very strong positive correlation.

Second, the number of online shoppers is greatly influenced by the numbers internet users. A very high

correlation coefficient of 0.8650 shows the linear relationship between the amounts. Third, utilization of the internet has a very high correlation coefficient of 0.824312. The internet should be available by default because it is necessary in order to shop online. Fourth, the current account of the correlation coefficient is 0.642157. The current account balance is higher with growth in the economy overall, which will mean a very high correlation. Fifth, the manufacturing sector's average capacity utilization rate correlation coefficient is 0.243349, which reports a positive linear relationship. At -0.472454, unemployment, sixth, shows a strong negative correlation coefficient, showing that there is a linear relationship. This means that when the unemployment rate is high, online shopping is reduced. The employment rate correlation coefficient is -0.404007 with cyber shopping; a very strong negative correlation can be seen. The correlation coefficient of economic growth also had a clear negative linear relationship at -0.339358. The consumer price fluctuation correlation coefficient is -0.197516. A weak negative linear relationship can be seen there.

Table 1. Online Shopping Industry Market Size and Key Variables

Year	Online market (Millions)	Year-on-year growth rate (%)	Per capita income (million)	Economic growth%	Average manufacturing capacity utilization %	Unemployment %	Employment %	Consumer Price Change %	Current account (Dollars in millions)	Internet utilization %	Internet user (10,000)
2001	3,347,067		1,372	4	74.9	4	59	4.1	8,428	56.6	2438
2002	6,029,876	80.2	1514	7.2	78	3.3	60	2.8	7,542	59.4	2627
2003	7,054,817	16.9	1604	2.8	77.9	3.6	59.3	3.5	15,584	65.5	2922
2004	7,768,105	10.1	1726	4.6	79.9	3.7	59.8	3.6	32,312	70.2	3158
2005	10,675,959	37.4	1796	4	79.2	3.7	59.7	2.8	18,607	72.8	3301
2006	13,459,595	26.1	1884	5.2	80.1	3.5	59.7	2.2	14,083	74.1	3491
2007	15,765,573	17.1	2016	5.1	80.3	3.2	59.8	2.5	21,770	75.4	3559
2008	18,145,516	15.1	2128	2.3	77.6	3.2	59.5	4.7	3,198	76.5	3619
2009	20,642,979	13.8	2175	0.3	74.4	3.6	58.6	2.8	32,791	77.2	3658
2010	25,202,992	22.1	2377	6.2	81.2	3.7	58.7	2.9	28,214	77.8	3701
2011	29,680,000	17.7	2488	3.7	80.2	3.4	59.1	4	26,068	78	3718
2012	34,068,200	12.8	2559	2	78.1	3.2	59.4	2.2	43,138	78.4	3812

Source: National Statistical Office (2013).

5.2. Online Industry and Government Regulations

The main online industry regulation was promulgated on March 30, 2002, titled the "Law on Electronic

Commerce and Consumer Protection". The law, with respect to the overall online shopping industry as a whole, mentions regulatory provisions including imprisonment and fines. The starting point for the online industry regulation is here. In the online

shopping industry there are many factors that influence growth. As before, the online industry contains government regulations that affect the country's national internet utilization, overall economic growth, per capita income, population trends, unemployment and employment rates, and many additional factors to be taken into account.

Government regulation of the online industry through government laws and regulations effect analysis. The government's e-commerce and consumer protection laws were first enforced in 2002.

Three months following, the online industry growth rate declined significantly. Online industry growth at the end of 2001 increased by 80.2% in 2002, after full-scale entry of regulations three months after the law was promulgated. Given this, by the end of 2002, the influence of full-scale regulation could be seen throughout 2003 and 2004. In 2003, only a growth of 16.9% compared to 2002, and in in 2004, the lowest growth rate of 10.1% was seen. A significant impact from government regulation can be seen. From 2001 to 2012 the average growth rate was 44.88 percent. Coming from 2002, the average growth rate was 18.91%.

Table 2. Online Industry and Highlights the Major Regulatory Laws

The main legal	Main Contents	Effective Date	Influence
E-Commerce and Consumer Protection Act	Communications vendors, Mail-order business, mail order defined for the agent,	2002.3.30	Zoom a significant impact on online shopping industry.
Distribution Industry Development Act	Obligations of the consumer notice, Promote orderly and efficient distribution industry and commerce	2003.7.30	Related to the general circulation. No significant impact.

Table 3. Government Regulations of the Online Industry, Laws

Competent ministries	Laws	Act provisions	Effective Date
Creation of Future Science	Software Promotion, enforcement, enforcement rules	13, 10	2000.1.21
	Computer Program Protection Act	9,17,28,29,	2000.1.28
	Information and Communication Network Utilization and Information Protection Act, enforcement, enforcement rules	3,21,22,23,24,27,28, 29,30,32,42,44,45,46,47,48,49,50,	2002.1.16
	Electronic Signature Act, enforcement, enforcement rules	3,25	1999.2.5
	Online Digital Content Industry Development Act, enforcement, enforcement rules	16,18,19	2002.1.14
	Metering laws, enforcement, enforcement rules	25	2006.3.3
	Foreign Trade, enforcement, enforcement rules	24.26	2007.4.11
	Unfair Competition Prevention and Trade Secret Protection Act	3,4,5	2007.12.21
Ministry of Industry	Trademark law, enforcement, enforcement rules	6.41.50.65	1990.1.13
	Utility Model Act, enforcement, enforcement rules	28,29	1995.12.23
	Distribution Industry Development Act, enforcement, enforcement rules	22	2003.7.30
	Framework Act on Electronic Commerce, enforcement, enforcement rules	12,13,17,18	2002.1.18
	Quality Management and Safety Control of Industrial Products, enforcement, enforcement rules	14,18,17,20,21,22,23,24,25,26	2005.12.23
The Fair Trade Commission	Monopoly Regulation and Fair Trade Act, enforcement, enforcement, regulation, enforcement, enforcement rules	3,4,5,6,7,12,15,23,24	1990.1.13
	Terms of the Act on the Regulation	3,6,7,9,	1986.12.31
	Consumer Protection in Electronic Commerce Act, Decree, Enforcement Rules	5,6,7,8,10,11,12,13~24,35	2002.3.30

	Display advertising laws for public hearing	3,4,6	1999.2.5
	Lateral trading subcontracting law offices	3,4,5,8,10	1984.2.3
	Installment Trade Act	3,4,13	1991.12.31
Ministry of Culture and Tourism	Youth Protection Act	14,15,16,17,18	1991.12.31
	Publishing and printing Promotion	22,23	1997.3.7
	Consumer Protection Act	10,11,12,18,19,20	2006.9.27
Ministry of Strategy and Finance	Use and Protection of Credit Information Act	23,24,	1995.1.5
	Electronic Transactions Act, enforcement, enforcement rules	16,28,37	2002.1.19
Ministry of Government Administration and Home Affairs	Act on the Protection of Juveniles from Sexual	8	2007.8.3
Ministry of Environment	On the Promotion of Saving and Recycling of Resources Law	16,23	2002.2.4

Source: Lee Hye-Young, & Choe Seon-Grak. (2008).

Table 4. Descriptive Statistics

	N	Minimum	Maximum	Average	Standard deviation	Skeweness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	The standard error	Statistic	The standard error
Online market (Millions)	12	3347067	34068200	15986723.25	9846966.294	.564	.637	-.734	1.232
Year-on-year growth rate (%)	11	10.1	80.2	24.482	19.9576	2.573	.661	7.108	1.279
Per capita income (million)	12	1372	2559	1969.92	386.911	.086	.637	-1.110	1.232
Economic growth%	12	.3	7.2	3.950	1.9110	-.197	.637	.016	1.232
Average manufacturing capacity utilization%	12	74.4	81.2	78.483	2.1272	-.868	.637	.036	1.232
Unemployment %	12	3.2	4.0	3.508	.2539	.288	.637	-.554	1.232
Employment %	12	58.6	60.0	59.383	.4529	-.511	.637	-.859	1.232
Consumer Price Change %	12	2.2	4.7	3.175	.7979	.574	.637	-.640	1.232
Current account (Dollars in millions)	12	3198	43138	20977.92	11963.513	.253	.637	-.641	1.232
Internet utilization %	12	56.6	78.4	71.825	7.4805	-1.213	.637	.258	1.232
Internet user (10,000)	12	2438.0	3812.0	3333.667	454.9302	-.994	.637	-.223	1.232

Table 5. The Correlation Coefficient Resulting Value

		Online market (Millions)	Year-on-year growth rate (%)	Per capita income (million)	Economic growth %	Average manufacturing capacity utilization%	Unemployment %	Employment %	Consumer Price Change %	Current account (Dollars in millions)	Internet utilization %	Internet user (10,000)
Online market (Millions)	Pearson	1	-.443	.985**	-.339	.243	-.472	-.404	-.198	.641*	.824**	.865**
	Significant probability		.172	.000	.281	.446	.121	.193	.538	.025	.001	.000
	N		11	12	12	12	12	12	12	12	12	12
Year-on-year growth rate (%)	Pearson		1	-.521	.621*	-.016	-.107	.450	-.224	-.503	-.720*	-.680*
	Significant probability			.100	.042	.962	.753	.165	.509	.115	.012	.021
	N			11	11	11	11	11	11	11	11	11
Per capita income (million)	Pearson			1	-.330	.314	-.477	-.386	-.171	.631*	.899**	.927**
	Significant probability				.295	.320	.117	.216	.595	.028	.000	.000

		Economic growth%	Average manufacturing capacity utilization %	Unemployment %	Employment %	Consumer Price Change %	Current account (Dollars in millions)	Internet utilization %	Internet user (10,000)
	N	12	12	12	12	12	12	12	12
Economic growth%	Pearson	1	.599*	.046	.463	-.200	-.320	-.357	-.354
	Significant probability		.040	.887	.129	.533	.310	.254	.259
	N		12	12	12	12	12	12	12
Average manufacturing capacity utilization %	Pearson		1	-.257	.373	-.245	.167	.406	.383
	Significant probability			.420	.232	.444	.605	.190	.219
	N			12	12	12	12	12	12
Unemployment %	Pearson			1	-.418	.199	-.053	-.441	-.487
	Significant probability				.177	.536	.870	.151	.108
	N				12	12	12	12	12
Employment %	Pearson				1	-.185	-.306	-.237	-.252
	Significant probability					.565	.333	.458	.430
	N					12	12	12	12
Consumer Price Change %	Pearson					1	-.451	-.229	-.251
	Significant probability						.141	.475	.431
	N						12	12	12
Current account (Dollars in millions)	Pearson						1	.568	.570
	Significant probability							.054	.053
	N							12	12
Internet utilization %	Pearson CorrelatioN							1	.994**
	Significant probability								.000
	N								12
Internet user (10,000)	Pearson								1
	Significant probability (both sides)								
	N								

Notes: 1. **. Correlatio N0.01 Significant probability (both sides).
    2. *. Correlatio N0.05 Significant probability (both sides).

Table 6. Descriptive Statistics for Model 2

	Minimum	Maximum	Average	Standard deviation	Skeweness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	The standard error	Statistic	The standard error
Online market (Millions)	3347067	34068200	15986723.25	9846966.294	.564	.637	-.734	1.232
Per capita income (million)	1372	2559	1969.92	386.911	.086	.637	-1.110	1.232
Current account (Dollars in millions)	3198	43138	20977.92	11963.513	.253	.637	-.641	1.232
Internet user (10,000)	2438	3812	3333.67	454.930	-.994	.637	-.223	1.232

Table 5 is the online industry's market size, per capita income, and current account. Descriptive statistics of the number of internet users are shown. Where the skewedness is negative, the left shows the shape of a long tail, minus the value of the number of internet users. Table 3 has greater kurtosis of distribution, sharp even if the distribution is smaller. Where the kurtosis is smaller than 3, it is showing a flat distribution. One look at the relationship between per capita income and the online shopping industry is very high at 0.985. Also, note that levels of 0.000 and 0.001 were statistically significant though the level never showed significance. The correlation between the number of internet users is also significant at 0.865. The correlation coefficient of the current account has a correlation coefficient of 0.641 at the 0.05 level (both sides) of significance.

5.3. Online Shopping Industry and Income

Let's look at the relationship between national income and per capita income; by 2001, this is 13.72 million won, with online shopping at a 3.347 trillion won industry turnover. In 2010, per capita income in 2001 compared to 24 million won has risen 74.92%. In contrast, the online shopping industry had a turnover of 25.2029 trillion won in 2010, which showed an increase of 652%. This means that over the last decade, the growth rate of per capita income was higher than a whopping 577.08%. Online shopping industry and the correlation coefficient of per capita income at 0.985333 show a very strong positive correlation.

Table 7. Model 2, Correlation Coefficient Results

		Online market (Millions)	Per capita income (million)	Current account (Dollars in millions)	Internet user (10,000)
Online market (Millions)	Pearson	1	.985**	.641*	.865**
	Significant probability		.000	.025	.000
Per capita income (million)	Pearson		1	.631*	.927**
	Significant probability			.028	.000
Current account (Dollars in millions)	Pearson			1	.570
	Significant probability				.053
Internet user (10,000)	Pearson				1
	Significant probability N				

Notes: 1. **. Correlatio N0.01 Significant probability (both sides).
　　　 2. *. Correlatio N0.05 Significant probability (both sides).

5.4. Online Shopping Industry and Real Economic Growth

Real economic growth and the growth of the online shopping industry was very high in comparison to the former. From 2001 to 2012, real economic growth in the country was 3.05%. In contrast, the average growth rate of the online shopping industry was a whopping 23.49% and 26.54%. Thus, the real economic growth rate of the online shopping industry in the country is higher than in 2007, showing that growth will more than double. In 2008 in Korea, during the U.S. financial crisis, 2009 gross domestic

product (GDP) rose by 0.3%, and online shopping industry increased 13.8%; the economic crisis was believed to not have a significant effect.

5.5. Unemployment Rate and the Online Shopping Industry

Online shopping industries and the relationship between the unemployment rate is high, even if the unemployment rate is greatly affected by industrial online shopping, but rather increasing. In 2009, the unemployment rate rose by 3.6%, despite a 0.4% increase in the total turnover of the online shopping

industry, which grew by 13.8% YoY. YoY growth was 15.1-13.8%, but a slight decrease in overall turnover occured.

5.6. Online Shopping Industry and Current Account

Korea's current account surplus in 2002 was 75 billion dollars, in 2003 it was 155 billion, and 323 billion was recorded in 2004. The online shopping industry was 6.0298 trillion won in 2002, an 80.2% year-over-year increase compared to 2001. In 2003 there was an increase of 17.0% of 7.0548 trillion won, and 7.7681 trillion won in 2004, an increase of 10.1%.

In 2009, profit of the Korean current account balance had reached 327 billion. The online shopping industry increased by 13.8% year-over-year. In 2010 the current account balance was 282 billion, and the online shopping industry increased 22.1% year-over-year to reach 25.2029 trillion won.

5.7. Online Shopping Industry and Internet Usage

For the online shopping industry and internet usage, there is a relationship with the household computer ownership rate. This means that the household computer penetration rate of for internet penetration and online shopping industry is growing at a higher rate. In 2008 and 2009, with the economic growth rate of 0.3%, despite a mere 1.07% increase in the utilization of the internet, the online shopping industry market grew 13.8% year-on-year as a whole and reached 20.6 trillion.

Ⅵ. Conclusion

In March 2014 at the Blue House, the presidential announcement of deregulation was based on key factors in the economy of the country that reported regulations impede economic growth. Therefore, a war against regulations was declared. The sensational popularity in China of Kim Soo-hyun and Jeon Ji-hyun

had many Chinese users find that to even try to purchase clothes, the user must have a certificate to install Active-X or a security program. To eliminate this inconvenience, deregulation was recently launched by the government. One of its achievements for online shopping must be authorized to purchase one certify-cate for foreigners and locals alike. As mentioned earlier, one must install a security program such as Active-X, which the government has also decided to regulate.

However, this law is based on consumer protect-tions and information to provide the obligations necessary to build the trust of consumers. However, inhibition of the growth of the internet and the online industry is obvious. Government regulations and variables had a significant impact on the online industry and can be seen through a statistical analysis. It is very strange that the government's e-commerce and consumer protection enforcement began in earnest in 2002. Before and after June, online industry growth declined significantly.

Growth in 2002 showed a 80.2% compared to 2001, but full-fledged law enforcement followed three months after. This means that full-scale entry of the law into force was applied in July 2002. The influence of growth in online industry in 2003 was a mere 16.9% compared to 2002. The government regulations had a large effect.

Economic growth and per capita income for the online industry's market situation saw a 2% decline in 2008. If growth of 15.1% is reached, the market will hit 18.1 trillion.

In 2009, year-over-year growth fell 1.3% and the market size reached 20.64 trillion. At the end of 2013 it is expected to reach 38 trillion won. According to the OECD Economic Outlook, the country's real econo-mic growth rate was 3.7% from 2014 to 2015; from 2016 until 2025 it is expected to be 1.9%. Korea's potential growth rate was 4.0% from 2010 until 2011; from 2014 until 2025 it has been estimated to grow at 2.4%. The market size of the online shopping industry with a simple model of economic growth and national income analysis, such as the unemployment rate,

shows relatively higher internet penetration. The other hand, government regulation has significantly decreased growth.

In this paper, the limitations of government regulations on the online industry and the overall industry growth rate cannot strictly be statistically analyzed. That is, the biggest influence of the e-commerce law may have contracted the online industry, but this is not the only factor. Because the crisis in 2002 and 2003, the whole of economy was shrinking. For this reason, despite the government's regulatory and economic variables that affect the development of the online industry a correlation and regression analysis of the two things can be significant.

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Policy Options on Wastewater Management of the University of the Philippines Los Baños (UPLB)

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ABSTRACT

Wastewater management at the University of the Philippines Los Baños (UPLB) affects not only its immediate environs but the whole Los Baños community. At present, the University dumps its wastewater without any form of treatment directly into the Molawin Creek. The enactment of the Philippine Clean Water Act of 2004 puts the University at the crossroads of making a decision on which wastewater management option to take. This study presents three possible policy options, one of which factored in the externalities. Using social benefit cost analysis (SBCA), it was revealed that investing in the rehabilitation and recommissioning of the existing UPLB wastewater facility is a worthwhile venture. Economic analyses showed positive Net Present Values (NPV) for the rehabilitation of the existing wastewater facility at a discount rate of 9% with a Benefit- Cost Ratio (BCR) greater than 1. The study further recommends that the multi-use function of the Molawin Creek be explored.

Keywords: clean water act, externality, social benefit cost analysis, wastewater

Ⅰ. Introduction

Different national policies have been crafted in adherence to Millenium Development Goal number 7 which pertains to ensuring environmental sustainability. Other than halving the number of the people who are currently without access to proper and adequate sanitation facilities, improving the water quality of water bodies is also of primary importance. Water quality and sanitation are often discussed in tandem due to their impacts on health. The impact of improved sanitation on health has long been established and the losses have been translated in terms of the overall reduction in productivity and competitiveness. Such reduction is attributed to water-related and water-borne diseases such as, but not limited to, acute watery diarrhea, diarrhea and typhoid fever.

RA 9275, also known as the Philippine Clean Water Act of 2004, was enacted to address key issues in protecting water bodies. The Department of Environment and Natural Resources (DENR) was the primary lead agency tasked to monitor and implement this Act. Under RA 9275, it is the responsibility of the institutions near bodies of water to secure a wastewater discharge permit from the DENR or the Laguna Lake Development Authority (LLDA) for those near Laguna Lake. These institutions are given 12 months

after the release of the Implementing Rules and Regulation (IRR) of the Act to secure such a permit.

At present, the University of the Philippines Los Baños (UPLB) has been directly dumping its wastewater into the Molawin Creek without any form of treatment. The enactment of the RA 9275 puts the University at the crossroads of making a sound decision that is not only financially viable but also socially beneficial to the entire Los Baños community. Waste water, if left untreated, poses an environmental and health hazard to the entire Los Baños community. It is the aim of this study to provide and analyze wastewater management options for UPLB such as: rehabilitation and recommissioning of the old UPLB STP, payment of penalty under RA 9275, and retaining the status quo. Such information could be utilized to make an informed decision regarding waste water management at the University.

Ⅱ. Methodology

2.1. Conceptual Framework

Water pollution is a form of an externality, specifically of the negative kind. Externalities or external diseconomy refers to situations when the effect of production or consumption of goods and services imposes costs or benefits on others which are not reflected in the prices charged for the goods and services being provided (OECD Glossary of Statistical Terms, http://stats.oecd.org/glossary/). As such, there could be under provision of the good that has higher benefit to society than from a private producer standpoint as in the case of positive production externalities. Meanwhile, in the instance of negative production externalities, there could be overprovision of a good or "bad" i.e., water pollution since the private cost of production is lower than the cost to society (Fig. 1). In a competitive market people ignore the external costs to others; therefore output will be at Qp (where Demand = Supply). This is socially inefficient because at Qp the Social Cost (MSC)> Social Benefit (MB). Social efficiency occurs at Qs

where Social Cost (MSC) = Social Benefit (MB). The area of the red triangle represents the deadweight loss.

The price mechanism determined through exchange in a free market does not take into account the external benefits and costs borne by third parties resulting in social inefficiency or resource misallo-cation and is broadly termed as market failure. This situation is by and large received as the rationale for government intervention.

Fig. 1. Water Pollution as a Form of Negative Externality
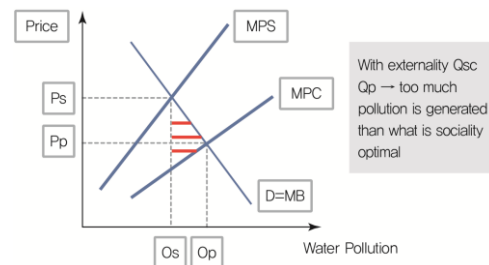
Generally, in order to remedy the problem of an externality, the external costs and benefits incurred by third parties should be internalized into the choice process of the buyers and sellers in the market and reflected in market prices. Various approaches to fix the externality include (1) assigning clear property rights, particularly when these are poorly defined; (2) proscribing the production of the good or practices that generate the externality; (3) regulating production or consumption to warrant that only a socially optimum amount of goods are produced or consumed; (4) taxing or subsidizing goods to increase the private costs of producing the goods that create the negative externality or to increase the demand for the good with positive spillovers; and (5) creating markets in the externalities. Different methods work better in different situations and assign divergent roles for states and markets. The political spectrum likewise favors one method over the other in terms of the extent of government intervention.

2.2. Method of Analysis

In general, environmental problems are difficult to assess and valuation techniques can be quite tricky.

Highly advanced countries and organizations like the European Union (EU), The Organization for Economic Co-operation and Development (OECD) and Asian Development Bank (ADB) have offered step-by-step guides on how economic cost benefit analysis (CBA) can be used in environmental projects. The CBA has limitations and it lies in the difficulty in assigning or attributing benefits or costs that are normally not given monetary values.

In this particular study, SCBA was used to assess and valuate the benefits that can be derived from the different options presented.

Option 1: Rehabilitate and Recommission the Old UPLB STP

Benefits refer to the avoidance of risk if the old UPLB STP is to be operational in the form of avoidance in loss of earnings due to diarrhea and avoidance in the loss of earnings of those who would have to care for the young that were inflicted with diarrheal disease. Cost would refer to the expenses to be incurred in the process of rehabilitating and recommissioning the old UPLB STP.

Option 2: Payment of Penalty to LLDA under RA 9275

Benefits refer to the amount of money that could have been used to fund other projects instead of rehabilitating or recommissioning the old UPLB STP. The cost would refer to the penalty imposed by the LLDA under RA 9275.

Option 3: Status Quo

This option considers the possibility that the current administration of the University would do nothing about its waste water problem.

2.3. Sources of Information and Data Collection

Secondary data were utilized in this study. Data on the cost to be incurred in the rehabilitation and recommissioning of the old UPLB STP was derived from the Ad Hoc Committee Report regarding the old UPLB Sewerage Treatment Plant (STP) conducted in 2012. Key informant interviews were conducted to gather information regarding the technical assumptions used in the SCBA computation.

Ⅲ. Results and Discussion

Option 1: Rehabilitation and Recommissioning the Old UPLB STP Using SCBA

The following assumptions were used in preparation of the SCBA matrix.

3.1. Computation of Population

a. The populations of the three barangays of Los Baños near the Molawin Creek such as: Batong Malake, San Antonio and Maahas in the year 2000 were used.

b. Population of the whole municipality of Los Baños in the year 2000 was used in the projections.

c. Population growth rate used was 2.93%.

3.2. Computation of Potential Benefits

a. *Cost of treatment avoidance* for the whole population of afflicted adults and children 5 years old and below. The number of the afflicted population was determined by multiplying the morbidity rate of CALA-BARZON in terms of diarrhea with the total population under consideration. To determine the proportion of adults and children under five years of age, the reported cases in the Annual Municipal Report of Los Baños for the year 2004 was used. By ratio and proportion, it was determined that 10% of the afflicted population was adults and the rest (90%) were children under five years of age. The cost of treatment used was P60.92 per case based on the study done in Cebu in 1989.

b. *Loss in Earnings Avoided (A)* is derived by multiplying the number of afflicted adults with the total number of days absent from work due to diarrhea multiplied by the prevailing wage rate in Los Baños, which is P315/day. This is based on the minimum wage schedule of DOLE for Los Baños.

c. *Loss in Earnings Avoided (B)* is derived by multiplying the number of days adults are absent from

work to take care of the children under 5 years old and below who were afflicted with diarrhea (refers to the Opportunity Cost of Labor). Children 5 years old and below afflicted with diarrhea are advised to stay at home for four days.

d. *Penalty avoidance* is computed based on the set criteria of the Pollution and Adjudication Board (PAB) Resolution No. 10-B Series of 2011 (Draft March 2011). It was determined that based on the criteria set (pH levels, TSS, BOD, DO, temperature and color), the minimum penalty of P10,000/day applies to UPLB.

e. *Payment from UPCO Housing* is computed based on the P50.00 fee that residents of UPCO pay for the collection of solid waste. It was assumed that the same amount of fee could be imposed to the residents of UPCO for the service that will be provided by the University once the STP is rehabilitated and recommissioned. The annual fee would amount to P69,600 based on the total number of houses in UPCO, which total 116 – assuming further that it is operating at full capacity.

f. *Other Potential Benefit/ Multi – Function* may include:

ⅰ. Fishery Productivity – an improvement of fishery productivity could be consi-dered a result of improved water quality.

ⅱ. Development of Molawin Creek as an eco-tourism site. Molawin Creek could be developed as an eco-tourism site or as part of the Makiling Ecotourism efforts where trekkers could be asked to pay an admission fee.

ⅲ. Incentive from the government if the quali-ty of the effluent coming out of the STP becomes better quality than the quality of water in the receiving water body.

These potential benefits were not included in the computation of the SCBA due to the lack of available technical data.

3.3. Computation of Estimated Cost

a. *Capital Outlay* refers to the amount of money that will be used to rehabilitate and recommission the old UPLB STP. Release of cash will also be done in phases in accordance to the recommended construction of the treatment trains. The cost of the pipe bridge was no longer included in the SCBA analysis as per advice of the water resource expert interviewed.

b. *Operations and Maintenance* is computed as a percentage of the capital outlay. Based on the key informant interview conducted, usually this is pegged at 5%.

3.4. Net Benefit

The net benefit was computed by deducting the estimated cost from the potential benefits of the project. The Net Present Value (NPV) of the Net Benefit was computed using a discount factor of 9% and 15%.

Tables 1 shows the SCBA computation using the projected population of the three barangays in Los Baños. Table 2, on the other hand, shows the SCBA considering the projected population of the whole municipality of Los Baños.

Table 1. SCBA of the Old UPLB STP Using the Projected Population of the Three Barangays in Los Baños, 2012-2067 (Values Are in Millions of Pesos)

ITEM	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
BENEFITS														
Loss in earnings avoided (A)	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04
Loss in earnings avoided (B)	0.31	0.32	0.32	0.33	0.34	0.35	0.36	0.38	0.39	0.40	0.41	0.42	0.43	0.45
Penalty Avoidance	3.65	3.65	4.02	4.02	4.42	4.42	4.86	4.86	5.34	5.34	5.88	5.88	6.47	6.47
Payment from UPCO Housing	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
TOTAL BENEFITS	4.05	4.06	4.44	4.45	4.86	4.87	5.32	5.33	5.83	5.84	6.39	6.40	7.01	7.02
COSTS														
Capital Outlay	14.00					70.00								
Operations and		0.70	0.70	0.70	0.70	0.70	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20

ITEM														
Maintenance														
TOTAL COST	14.00	0.70	0.70	0.70	0.70	70.70	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20
NET BENEFIT (Total benefit - Total cost)	(9.95)	3.36	3.74	3.75	4.16	(65.83)	1.12	1.13	1.63	1.64	2.19	2.20	2.81	2.82

Table 1. Continued

ITEM	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
BENEFITS														
Loss in earnings avoided (A)	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06
Loss in earnings avoided (B)	0.46	0.47	0.49	0.50	0.52	0.53	0.55	0.56	0.58	0.60	0.61	0.63	0.65	0.67
Penalty avoidance	7.11	7.11	7.82	7.82	8.61	8.61	9.47	9.47	10.41	10.41	11.46	11.46	12.60	12.60
Payment from UPCO housing	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
TOTAL BENEFITS	7.68	7.69	8.42	8.44	9.23	9.25	10.13	10.15	11.11	11.13	12.19	12.21	13.37	13.39
COSTS														
Capital Outlay							17.50							
Operations and Maintenance	4.20	4.20	4.20	4.20	4.20	4.20	4.20	5.08	5.08	5.08	5.08	5.08	5.08	5.08
TOTAL COST	4.20	4.20	4.20	4.20	4.20	4.20	21.70	5.08	5.08	5.08	5.08	5.08	5.08	5.08
NET BENEFIT (Total Benefit - Total Cost)	3.48	3.49	4.22	4.24	5.03	5.05	(11.57)	5.07	6.04	6.05	7.11	7.13	8.30	8.32

Table 1. Continued

ITEM	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053
BENEFITS														
Loss in earnings avoided (A)	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08
Loss in earnings avoided (B)	0.69	0.71	0.73	0.75	0.77	0.79	0.82	0.84	0.87	0.89	0.92	0.94	0.97	1.00
Penalty avoidance	13.86	13.86	15.25	15.25	16.77	16.77	18.45	18.45	20.29	20.29	22.32	22.32	24.56	24.56
Payment from UPCO housing	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
TOTAL BENEFITS	14.68	14.70	16.11	16.13	17.68	17.70	19.40	19.43	21.30	21.33	23.39	23.42	25.68	25.71
COSTS														
Capital Outlay			17.50											
Operations and Maintenance	5.08	5.08	5.08	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
TOTAL COST	5.08	5.08	22.58	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
NET BENEFIT (Total Benefit - Total Cost)	9.60	9.62	(6.47)	10.18	11.73	11.75	13.45	13.48	15.35	15.38	17.44	17.47	19.73	19.76

Table 2. SCBA of the Old UPLB STP Using the Projected Population of the Municipality of Los Baños, 2012-2067, (Values Are in Million Pesos)

ITEM	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
BENEFITS														
Cost of treatment Avoided	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.07
Loss in earnings avoided (A)	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.11	0.11	0.11

ITEM														
Loss in earnings avoided (B)	0.94	0.97	1.00	1.03	1.06	1.09	1.12	1.15	1.18	1.22	1.25	1.29	1.33	1.37
Penalty Avoidance	3.65	3.65	4.02	4.02	4.42	4.42	4.86	4.86	5.34	5.34	5.88	5.88	6.47	6.47
Payment from UPCO Housing	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
TOTAL BENEFITS	4.79	4.82	5.22	5.25	5.69	5.72	6.20	6.24	6.76	6.80	7.37	7.42	8.05	8.09
COSTS														
Capital Outlay	14.00					70.00								
Operations and Maintenance		0.70	0.70	0.70	0.70	0.70	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20
TOTAL COST	14.00	0.70	0.70	0.70	0.70	70.70	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20
NET BENEFIT (Total benefit - Total cost)	(9.21)	4.12	4.52	4.55	4.99	(64.98)	2.00	2.04	2.56	2.60	3.17	3.22	3.85	3.89

Table 2. Continued

ITEM	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
BENEFITS														
Cost of treatment Avoided	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.11	0.11
Loss in earnings avoided (A)	0.12	0.12	0.12	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.17
Loss in earnings avoided (B)	1.41	1.45	1.49	1.54	1.58	1.63	1.67	1.72	1.77	1.83	1.88	1.94	1.99	2.05
Penalty Avoidance	7.11	7.11	7.82	7.82	8.61	8.61	9.47	9.47	10.41	10.41	11.46	11.46	12.60	12.60
Payment from UPCO Housing	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
TOTAL BENEFITS	8.78	8.83	9.59	9.64	10.47	10.53	11.44	11.50	12.50	12.56	13.66	13.73	14.94	15.00
COSTS														
Capital Outlay							17.50							
Operations and Maintenance	4.20	4.20	4.20	4.20	4.20	4.20	4.20	5.08	5.08	5.08	5.08	5.08	5.08	5.08
TOTAL COST	4.20	4.20	4.20	4.20	4.20	4.20	21.70	5.08	5.08	5.08	5.08	5.08	5.08	5.08
NET BENEFIT (Total benefit - Total cost)	4.58	4.63	5.39	5.44	6.27	6.33	(10.26)	6.42	7.43	7.49	8.59	8.65	9.86	9.93

Table 2. Continued

ITEM	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053
BENEFITS														
Cost of treatment Avoided	0.11	0.12	0.12	0.12	0.13	0.13	0.13	0.14	0.14	0.15	0.15	0.16	0.16	0.17
Loss in earnings avoided (A)	0.18	0.18	0.19	0.19	0.20	0.20	0.21	0.22	0.22	0.23	0.23	0.24	0.25	0.26
Loss in earnings avoided (B)	2.11	2.17	2.24	2.30	2.37	2.44	2.51	2.58	2.66	2.74	2.82	2.90	2.98	3.07
Penalty Avoidance	13.86	13.86	15.25	15.25	16.77	16.77	18.45	18.45	20.29	20.29	22.32	22.32	24.56	24.56
Payment from UPCO Housing	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
TOTAL BENEFITS	16.33	16.40	17.86	17.93	19.53	19.61	21.37	21.46	23.39	23.47	25.60	25.69	28.02	28.12
COSTS														
Capital Outlay			17.50											
Operations and Maintenance	5.08	5.08	5.08	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95

TOTAL COST	5.08	5.08	22.58	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
NET BENEFIT (Total benefit - Total cost)	11.25	11.33	(4.72)	11.98	13.58	13.66	15.42	15.51	17.44	17.52	19.65	19.74	22.07	22.17

Table 2. Continued

ITEM	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067
BENEFITS														
Cost of treatment Avoided	0.17	0.17	0.18	0.19	0.19	0.20	0.20	0.21	0.21	0.22	0.23	0.23	0.24	0.25
Loss in earnings avoided (A)	0.26	0.27	0.28	0.29	0.30	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38
Loss in earnings avoided (B)	3.16	3.25	3.35	3.45	3.55	3.65	3.76	3.87	3.98	4.10	4.22	4.34	4.47	4.60
Penalty Avoidance	27.01	27.01	29.71	29.71	32.68	32.68	35.95	35.95	39.55	39.55	43.50	43.50	47.85	47.85
Payment from UPCO Housing	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
TOTAL BENEFITS	30.68	30.78	33.59	33.70	36.79	36.91	40.30	40.42	44.15	44.28	48.37	48.51	53.01	53.15
COSTS														
Capital Outlay														
Operations and Maintenance	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
TOTAL COST	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
NET BENEFIT (Total benefit - Total cost)	24.73	24.83	27.64	27.75	30.84	30.96	34.35	34.47	38.20	38.33	42.42	42.56	47.06	47.20

Table 3. Economic Analysis of the Rehabilitation and Recommissioning of the Old UPLB STP

Item	3 Barangays (Maahas, San Antonio, BatongMalake)		Municipality of Los Baños	
	Discount Rate @ 15%	Discount Rate @ 9%	Discount Rate @ 15%	Discount Rate @ 9%
NPV Benefits (in M PhP)	38.41	82.85	44.37	94.24
NPV Cost (in M PhP)	58.11	90.71	58.11	90.71
NPV Net Benefits (in M PhP)	(19.70)	(7.86)	(13.74)	3.53
Benefit Cost Ratio	0.7	0.9	0.8	1.0
IRR	8%	8%	10%	10%

Table 3 summarizes the financial viability of the project under consideration for Table 1 and 2. The results for Table 1 where only the three barangays in Los Baños were considered yielded the following results; at a discount rate of 15%, the NPV is valued at negative PhP 19.70 M with a BCR of 0.7. Using a discount rate of 9%, the NPV was valued at a negative 7.86M with a BCR of 0.9.The IRR computed was 8%.

Considering a discount factor of 15% in Table 2 where the population of the whole Municipality of Los Baños was considered, a negative NPV (net benefits) amounting to PhP 13.74M and a BCR of 0.8 was derived. These values mean that the rehabilitation and recommissioning would not be a profitable undertaking for the University. However, a discount factor of 9% resulted in positive NPV (Net Benefit) amounting to PhP 3.53M with a BCR of 1.0 and an IRR of 10%.

The negative value of NPV's derived and the less than 1 BCR in the computation of the SCBA needs careful interpretation. The values could be a reflection of the observation that Molawin Creek was not really polluted during the period covered in the study. In assessing the benefit side of the equation, it can be gleaned that the main source of benefit is penalty avoidance; lower penalties therefore would mean lower social benefits. The same is true for the cost of illness method where the cost of treatment, loss in

earnings and opportunity cost of labor were factored in. The value of these variables increase with the number of individuals afflicted with the diarrheal diseases and with a higher cost of treatment per case. Again, a lower cost of illness value reflects a lower morbidity rate which is a sign of better health conditions which may be attributed to a clean or safe environment.

The fact that the SCBA yielded negative results leads us to the next question; should the University still pursue this undertaking even though the project has been proven to be financially infeasible? The answer is YES.

The main objective of the University in undertaking this project is to comply with the rules and regulations set forth under RA 9275. Compliance entails cost and sound decision making. However, the law and the penalties imposed were created under the assumption that the bodies of water near the institutions are already polluted and the law serves as a measure for the abatement of pollution as cited in Sec 3 Coverage of the Act of RA 9275 which states that *"This Act shall apply to water quality management in all water bodies: Provided, that it shall primarily apply to the abatement of pollution from land based sources. Provided, further that the water quality standards and regulations and the civil liability and penal provisions under this Act shall be enforced irrespective of the sources of pollution".*

The case of Molawin Creek in UPLB is different. Advento (2010) stated in his study that Molawin Creek is healthy and that effluent discharge of the University at the time of the study in terms of BOD levels is still acceptable under the law. It was concluded further that the DO upstream of the creek was already low to start with, but the creek was able to "aerate enough oxygen to acceptable levels from the discharge point". The creek is able to self-purify. In another study, Dr. Macrina T. Zafaralla placed an Aquatic Macrophyte Biosorption System (AMBS) in the Molawin Creek which serves a natural filter. The AMBS made use of bamboo sticks and water hyacinth placed perpendicular to the flow of the creek. The portion of the creek under the Bocobo Bridge was declared a BioPark.

The water resources expert interviewed for this study shared that: 1) water treatment plants/ technologies are generally expensive, 2) when subjected to an SCBA, negative NPV's and BCR's below 1 are not exceptional, and 3) companies with wastewater treatment plants pass on the cost to end-users.

It should also be noted that the multi-use function of the Molawin Creek could potentially increase the benefits derived from rehabilitating and recommissioning the old UPLB STP.

3.5. Potential Sources of Funding

Tables 1 and 2 registered negative net benefits during the construction phase/year only. This means that capital investments really affect the overall financial viability and success of the project. Given that the University has limited capital resources and has an array of competing priority projects, other sources of funding may be sought. Establishing partnerships with international funding agencies (e.g. JICA, ADB, World Bank, UNEP) in supporting the activity could be explored.

Program or project partnerships could be also done with local agencies such as the Department of Health (DOH), the Department of Science and Technology (DOST) and with the local government unit of Los Baños, Laguna. A strategic partnership in monitoring the water quality of the Molawin Creek between the University and the LLDA could also be explored. The activity could even be an income generating activity for the University and the data to be gathered could be used for future researches.

Option 2: Payment of Penalty to LLDA under RA 9275

Table 4 shows the adjusted value of the penalty that would be imposed on the University if it decides to pay the penalty rather than rehabilitate and recommitssion the STP. The values were computed based on the guidelines set forth by the DENR and as per PAB Resolution No. 10 (March 2011). Adjustments in value

were made based on the proposed increment of 10% every two years to factor in the effect of inflation.

Table 4. Computed Penalty to Be Imposed on the University Based on DENR Guidelines

YEAR	Annual Penalty (P10,000/day x 365 days)	Adjusted Value of the Penalty
	(in million pesos)	
2012	3.65	3.65
2017	18.25	22.41
2022	36.50	55.08
2032	73.00	166.22
2042	109.50	376.22

Table 5. Adjusted Value of the Total Cost for the University of Rehabilitating and Recommissioning the Old UPLB STP

Phase	STP Capacity(MLD)	Strategy	Time Frame	Adjusted Total Value(construction alone) (a)	Adjusted Value of Operations and Maintenance[a/] (b)= a x 0.05	Adjusted Total Value d = (a +b +c)
1	0.8	Rehabilitation of the old STP	2012 -2013	14.00	0.70	14.70
2	2.0 (2.8)	Construction of Additional Treatment Train by 2.0 MLD	2015-2017	99.50 (n=5)	4.97	103.97
3	0.5 (3.2)	Construct Additional Treatment Train with 0.5 MLD capacity	2030-2032	39.85 (n=20)	1.99	41.84
4	0.5 (3.8)	Construct Additional Treatment Train with 0.5 MLD capacity	2041-2042	60.13 (n= 30)	3.00	63.13

Table 5 shows the adjusted value of the cost for the University of rehabilitating and recommissioning the old UPLB STP. Values were adjusted by computing the future value of the estimates calculated by the technical experts for such activities.

Fig. 2. Graphical Representation of Comparing the Rehabilitation Cost of the STP vs. Payment of Penalty for a Span of 30 Years (2012-2042)
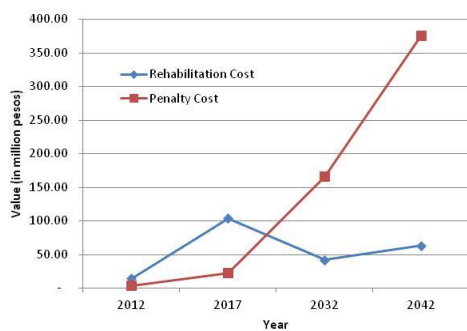
Fig. 2 shows that in the long run, it is actually more beneficial for the University to invest in the rehabilitation of the old UPLB STP than to pay the penalty to be imposed by the LLDA. However, the opposite is true in the short run.

In both options presented above, the main concern has been the cost of the alternative presented to the University. The benefit of such options should also be weighed. As in most environmental analysis problems, putting a value on a certain resource, especially when it is a public good, is challenging.

Option 3: Status Quo

This third option implies the possibility that the current administration would pass on the wastewater management problem to the next helmsman. Although this is a possible option, it also means that the University would be neglecting its social responsibility and violating prevailing ethical standards. The

University should then be prepared to handle an onslaught of criticism from social, political, ethical and environmental viewpoints. The penalty the University is expected to shoulder would also snowball. The value of the penalty would be the same as the one presented in Table 4.

IV. Conclusion

The University is faced with three options and it was found that rehabilitating and recommissioning the old UPLB STP is the most socially beneficial and socially responsible option. Using SCBA and under certain conditions, rehabilitating and recommissioning the old UPLB STP was proven to be a worthwhile project. There is vast literature on valuation techniques for heavily polluted environments. However, valuation techniques for special cases like the Molawin Creek should also be looked into. In future studies, the multi-use function of the Molawin Creek could be considered as this may result in higher values for the NPV and BCR.

There are certain provisions in the RA 9275 that should be clarified especially those pertaining to incentives and rewards. It is therefore recommended that a more in-depth study and additional policies, if found necessary, be formulated to address preventive pollution measures. A more operational set of incentives and rewards would also be necessary for monitoring minor tributary water bodies.

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Value Chain Analysis of Philippine Native Swine (*Sus scrofa philippinensis*) Processed as *Lechon* in Major Production Areas in the Philippines

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ABSTRACT

Among Asian countries, the Philippines ranked third after Vietnam and China in terms of pig production. Philippine swine production is dominated by backyard farms which is one of the major contributors in the livestock industry and in the entire agriculture sector. The native Philippine swine (*Sus scrofa philippinensis*) is the predominant breed raised in backyards. The value chain of native swine raised in the Quezon Province and processed as *lechon* in La Loma, Quezon City, Philippines was analyzed in this study. Primary data were obtained through personal interviews with the producers, agents, traders, processors and end consumers. Secondary sources of data were also used in this study. Results showed that the value chain of the Philippine native swine comprised small-scale holders. The important value chains identified and described were the backyard producers, village agents, hog dealers, *lechon* processors and end consumers. Furthermore, it was noted that backyard producers had the highest value added per unit during the lean season while the processors had the highest value added per unit for the peak season. Production of native pigs can be a viable source of income for swine producers who cannot cope with the high price of commercial swine feeds and for those who have limited capital, making it essential to conserve and preserve this breed and provide the enabling environment factors in the supply and demand areas.

Keywords: agricultural marketing system, Cost and Return Analysis, La Loma, value chain, Philippine native swine

Ⅰ. Introduction

The Philippines ranked third after Vietnam and China in terms of pig production in Asia in 2012 (Food Outlook, 2012, as cited in Lapuz, 2014). In the Philippines, swine is one of the major contributors in the livestock industry and in the whole agriculture sector. There was a 0.62% increase in the total supply

of swine from 24.40 million heads in 2012 to 24.55 million heads in 2013. The swine industry in the country is dominated by backyard farms, contributing to approximately 65% of the total stocks in 2013 (BAS, 2013). The predominant swine raised in backyards is the Philippine's native swine (*Sus scrofa philippinensis*) as initial stocks are available in the barrios. There have been studies that proved the potential of Philippine native breed of swine in the country, a breed commonly raised in house backyards for subsistence

purposes using a free-range system. Since the late 90s, the roasted pig market has been eyed as a potential market by the native swine industry. The native swine processed into roasted pig or *lechon* has attributes which are preferred more than the roasted commercial breed of pig. *Lechon* has been a traditional delicacy in Filipino dining. The main market for native hogs in this study was identified to be the *lechon* market since this breed is preferred for roasting because of certain characteristics such as having leaner and tastier meat, crispier roasted skin and a relatively small size which is easy for roasting. This study focused on the agricultural marketing system of Philippine native swine with *lechon* as the end product.

The study presented the value-adding activities undergone by native swine starting from farm production in Quezon province up to its processing as *lechon* in La Loma, Quezon City. The chain actors, enabling environment factors and service providers in the supply, trading and demand areas were described. It answered the problem, "How much value was added in each of the levels undergone by native hogs as they passed along the chain up to consumption as roasted pig and how could the efficiency in the value-addition activities of native swine be increased along the chain?

The general objective of the study was to present and analyze the value chain of native swine raised in Quezon province and processed as *lechon* in La Loma, Quezon City. Specifically, this study aimed to identify and characterize the key actors in the chain and map out the agricultural marketing system; determine the value-adding activities involved in each level of the chain and their value contribution to the final product; determine the profitability of the major activities done by the key actors of the value chain identified; identify the problems that affect the operations of the key actors in the different levels of the chain; and recommend appropriate courses of actions for the problems identified.

Ⅱ. Review of Related Literature

Hellin and Meijer (2006) defined the value chain as, "The full range of activities which are required to bring a product or service from conception, through different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final customers, and final disposal after use." It involves a series of processes and product flows affected by the factors from an enabling environment and services provided by various involved institutions (Miller & Jones, 2010).

The value chain analysis includes the assessment of industry players, the factors in the enabling environment affecting the performance of the industry, and the institutions providing services to the key players that affect the enabling environment. The integrated relationship between the players of the chain will also be analyzed. This is to identify the drivers and constraints of efficiency, productivity and competitiveness so that appropriate actions will be done (Fries, 2007 as cited by Miller & Jones, 2010). The basic players are composed of the producers, traders and consumers, which are influenced by the enabling environment as driven by service providers.

The enabling environment is the general business climate that characterizes the situation of the operations of a certain chain. It is composed of the factors brought about by the service providers (Miller & Jones, 2010). It may include significant features and developments that influence or may influence the whole chain and the operations in each level, which are subject to dynamic changes. On the other hand, service providers can be defined as the various institutions that provide support to the different operations done by the different chain actors. These could either be other enterprises or support organizations that provide business and extension services which are deemed necessary in the aspects of market and technology development. These institutions include those which currently support and could potentially support the chain operations. They may be involved in the operations for input supplies, market information,

financial services, transport services, quality assurance and support for product development and diversification. A useful tool to analyze the integration between the value chain actors, the enabling environment factors and the service providers is the use of a market map. It is a conceptual and comprehensive visualization of the value chain actors, the factors in the enabling environment and service providers to describe interactions and competition. Because of the difference in complexity and scope of value chains, there is no fixed rule on how to conduct a study about it (Hellin & Meijer, 2006).

In the case of an agricultural commodity, the value chain can also be termed as an agricultural marketing system which is defined as the set of players integrated in a sequence of value-adding activities starting from the production until the commodity reaches the final consumers. It is a complex system within which various subsystems interact with each other and with different marketing environments (Piadozo, 2001).

Bueno (2009) discussed the common marketing system of live animals in the Philippines. It was concluded that in a developing country like the Philippines, the marketing of livestock and meat as well as meat products appeared to be fragmented due to the presence of at least one agent between the primary producer and the end processor. This caused livestock injury and hassle as the animal was transferred from one intermediary to another. This resulted in decreased quality as well as the quantity of meat products along the production chain starting from the supply area to the demand area. Another reason cited for the prevalence of a considerable amount of loss in the marketing system of a developing country like the Philippines was the absence of 'economic incentive' to reduce losses, in which quantity was given more priority over quality.

Agbisit and Bantoc (2004) have identified various methods of marketing livestock in the country: through concentration yards, *barrio* agents, *viajeros*, city dealers, retailers and contract growing schemes. The concentration yards were centralized locations at which farmers and traders were bringing their animals

to be traded. The barrio agents were the people who have skills in estimating live weights. They could be either collectors of animals from scattered backyard farms or wholesalers who directly sell to retailers. The *viajeros* were wholesalers whose market could be other wholesalers, retailers or processors. The city dealers were the intermediaries between provincial wholesalers and city wholesalers. Retailers were the buyers from the wholesalers and the distributors to the final consumers. Contract growing schemes were formal agreements between producer and supplier.

Merin (2011) studied the value chain analysis of pork in Laguna. The cost and return, percent mark-up and cost structure tools were used in the analysis. In this study, it was concluded that selling processed pork was more profitable to every player in the chain than selling the raw meat or carcass. The discussed quality preference for raw meat was pinkish color as opposed to a lightly colored carcass. It was also mentioned in the study that the majority of the meat brokers in Laguna acquired the hogs from Quezon province. About 30% of hogs being purchased, processed and marketed came from this place. With regards to profitability, small-scale distributors or processors incurred high input costs relative to their total sales, making them less profitable so it was recommended to implement an expansion.

Another purpose of value chain is to take advantage of exportation opportunities. According to Kaplinsky and Morris (2000), this is a time when globalization is taking place very fast. If an organized system approach is incorporated into agricultural operations, it will lead toward having implied and explicit competitive advantage. Production efficiency is key toward penetrating the international market which would lead to sustainable growth and development. Value chain understanding and analysis is needed to cope with various dynamic features and trends in the industry. These are true for countries with rich agricultural resources and potential for development.

There is an existing primary demand for *lechon*. *Lechon* processors opt to use native hogs as the main

input; therefore, there is a derived demand for native hogs. In the future, with the increasing trend for a healthy diet, people will look for organic food (Eleazar, 2010) and native swine is a perfect example of an organic main ingredient. The problems and prospects identified in a value chain study may serve as input for policy formulation and may serve as guide in decision making of various marketing participants.

Ⅲ. Methodology

Primary data were gathered from the major Philippine native swine producing area (Quezon Province) and major *lechon* processing area (La Loma, Quezon City). The key actors were the major respondents of the study. There were 34 producers, 13 agents, 4 dealers, 13 processors and 20 consumers who were interviewed about their personal background, business profile, and the market structure, conduct and performance with regards to native hogs. In addition, representatives of the identified participating institutions or service providers of the value chain being studied were also interviewed. Observations were done to identify and describe the factors in the enabling environment relative to the operations of the value chain actors.

The value-adding activities in each level of the value chain were determined and analyzed using Michael Porter's generic value chain model (Porter, 1985). The description of the significant contributing activities of the key actors in the value chain led to the analysis of their integration with each other in relevance to the whole value chain. Cost and return analyses of the monthly operations of the players were also derived. These analyses led to the computation of cost per unit, selling and buying prices, value-added or margin and marketing margins. Value-added or margin is an implication of realized profit of a certain value chain actor (Recklies, 2001).

3.1. Description of the Study Area (Quezon Province)

CALABARZON or Region IV-A is an area located in Southern Luzon in south-west and adjacent of Metro Manila, Philippines. The name stands for the provinces it is composed of which are Cavite, Laguna, Batangas, Rizal and Quezon.

The region is one of the highly urbanized areas in the country that has potential in promoting industrialization. Moreover, it has a balanced and healthy economy because of the presence of natural endowments in natural resources and immense area for agribusiness. According to BAS (2013), the area's Gross Regional Domestic Product (GRDP) in 2012 was 1,770, 603 million pesos at current prices and 1, 097, 720 million pesos at constant prices (base year = 2000), which was 17.39% of the national Gross Domestic Product (GDP). Meanwhile, in the same report, the region's Gross Value Added (GVA) to Agriculture, Fishery and Forestry Sector was 108,940 million pesos at current prices and 64, 356 million pesos at constant prices.

As of 2011, 6.25% of its economy was shared by agriculture, fishery and forestry sectors. The region's total agricultural area was 588, 516 hectares. From the total agricultural performance of the area, livestock shared 25.2%, being the second highest next to poultry. Hog was the top commodity in the region's total agricultural output, having about 5.47% production growth rate. Furthermore, CALABARZON was the second hog and chicken producer region in the country's national production (BAS, 2011).

Among of the provinces in the region, Quezon is one of which has rich agricultural land. Its borders are Aurora province in the north, the provinces of Laguna and Rizal to the west, Batangas in the southwest and Camarines Norte and Camarines Sur in the southeast. Its topography can be described as having a rough and uneven landscape with only few plains, valleys, swamps and narrow strips of land along the coast and river valley. These characteristics make the area suitable for growing crops. The lowlands along the coast are well-drained, wavy and narrow, having an average width of 30 km. The slope ranges from 0-3%,

making the place ideal for the practice of agricultural activities.

The total land area is 870,660 ha (53.63% of CALABARZON's land area), from which the agricultural land area is 513,681 ha (approximately 59% of the provincial land area), whereas the length of coastline is 1,066.36 km. It is subdivided into four districts with a total of 41 municipalities and around 1,242 *barangays*, wherein 241 are urban while 1,001 are rural. The seat of government is situated in Lucena City. As of 2012, the approximate population is about 2,010,281. It is dominated by Catholics (93%).

The major agricultural products of the province are coconuts, fish and swine. Most native swine producers are situated is in the coconut areas of the 3rd district, also known as the Bondoc Peninsula. The Bondoc Peninsula is an area in the southern part of the province, which is composed of 12 municipalities with about 386,783 people. The area has a great potential for rural and agribusiness-led development. It is the place where the backyard native hog producers are concentrated. Four of the 12 municipalities in Quezon Province include Catanauan, Lopez, Macalelon and General Luna. Catanauan is a first class municipality in Quezon Province which is approximately 264 kilometers from Metro Manila and 128 kilometers from Lucena City, the provincial capital of Quezon. Lopez, on the other hand, is a first class municipality situated in the southern part of the province, 220 kilometers away from Manila, 83 kilometers away from Lucena City, being bordered by the municipalities of Catanauan and General Luna in the south, Macalelon in the southwest, Calauag in the northeast, Gumaca in the west, Buenavista and Guinayangan in the east (WOWQUEZON.com, n.d.). Macalelon is a third class municipality which is located approximately

220 kilometers away from Manila 84 kilometers from Lucena City, bordered by Buenavista in the east, General Luna and Catanauan in the southeast, and Pitogo and Unisan in the northwest. General Luna is a fourth class municipality approxi-mately 224 kilometers from Metro Manila and 92 kilometers from Lucena City. It is bordered by Catanauan and Buenavista in the east, and Macalelon and Pitogo in the north. Fig. 1 shows a map drawing of Quezon province and its location in the Philippines.

3.2. Description of the Study Area (La Loma, Quezon City)

Quezon City is a highly urbanized place at the heart of Metro Manila which is approximately 16, 112.8 hectares, about ¼ of Metro Manila. Its borders are Manila in the southwest, Caloocan City in the west, Valenzuela City in the northwest, the cities of San Juan and Mandaluyong in the south, the cities of Marikina and Pasig in the southeast and the provinces of Bulacan and Rizal in the north. Fig. 2 shows the location map of La Loma in Quezon City.

One of the distinctive places in Quezon City is La Loma as it has been regarded as the *Lechon* Capital of the Philippines as declared by former Mayor Sonny Belmonte on February 4, 2004. It is located in the southwest part of Quezon City. There are currently 14 *lechon* processing firms here situated very near each other in the streets of Calavite and Amoranto. One distinguished landmark here is the La Loma Cockpit in the concentration area of the *lechon* processing firms.

This place celebrates the La Loma *Lechon* Festival during the month of May. It is organized by the La Loma *Lechoneros* Association whose members are the proprietors of the *lechon* processing firms.

Fig. 1. Map of Quezon Province and its Location in the Philippines.
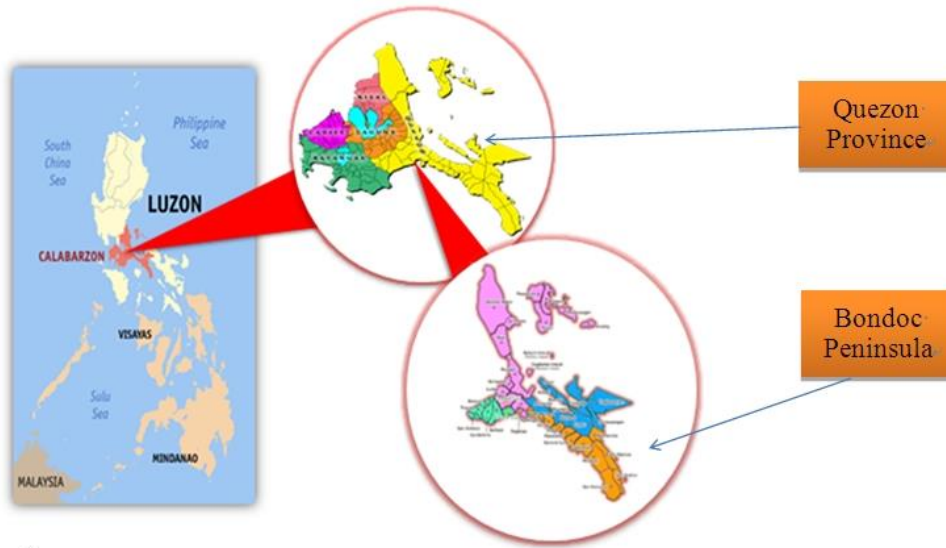
Sources: Calabarzon (n.d.), Environmental Management Bureau (n.d.), and Kezon 101 (2014).

Fig. 2. Location Map of La Loma in Quezon City, Metro Manila.

Sources: Makati Map (n.d.), Map of Metro Manila (n.d.), and The richness of La Loma (n.d.).

Ⅳ. Results and Discussion

4.1. General Characteristics of Value Chain Actors

4.1.1. Producers

A total of 34 native swine producers were interviewed from different *barangays* located in different municipalities of the mountainous area of Bondoc Peninsula, Quezon Province. Aside from hogs, various crops are planted and other animals are also raised in the area. All of the native swine raisers interviewed were smallholders or into backyard operations only.

The average age in years of the native hog producers was 45, with 27 as the youngest and 62 as the oldest. The respondents were dominated by people with ages ranging from 36 to 45 years old (44.12%). Eight of them were in the range of 56 to 62 years old (28.53%), six were in the range of 46 to 55 years old (17.65%) while the remaining five were in the range of 27 to 35 years old (14.70%). This extreme difference in age can be an indication that hog raising was a predominant activity in the different communities of the major native hog producing areas in Quezon Province and can be practiced by anyone from the family regardless of age.

Majority of the native hog producers interviewed were females (82.35%), while 17.65% of the producers interviewed were males. This result was in line with the report of Villar et al. (2002), indicating that hog raising in the smallholders' perspective was not a regular business endeavor usually managed by housewives. Hog raising was only practiced when the need arose or when there were capital resources available. Of the respondents, most (94.12%) were married and with own family, whereas the remaining two respondents were single and were living with their parents and siblings. A majority (52.94%) of the native swine producers were not employed, mainly because they were focused in native swine production.

4.1.2. Agents

There were 13 agents interviewed in this study. Among the respondents, six were from Catanuan, three were from Lopez, two were from Macalelon and the remaining two were from General Luna. These agents collected native hogs from different backyard farms and they served as the logistical arm in delivering them to hog dealers or the bulk-sellers.

The average age of the agents was 46 years old. The youngest was 32 while the oldest was 49. Most (69.23%) were in their forties while the others (30.77%) were in their thirties. Most (84.62%) of them were male while only two (15.38%) were female. In the case of the latter, either their husbands or brothers were the ones who were travelling to collect native hogs from backyard producers. The work of an agent was tiresome and therefore dominated by male people in their forties. Among the 13 respondents, 11 (84.62%) were married and already had families of their own while the other two (15.38%) were single. The agents were at least elementary graduates (16.66%); some reached high school but were not able to finish (33.30%); a majority (53.85%) had graduated from high school.

4.1.3. Dealers

The native hog dealers were the bulk-sellers of native hogs that had the logistical capacity to deliver the native hog supply to the demand area. They had hog dealer licenses issued by the Bureau of Animal Industry which could be renewed every year. Four traders were interviewed in the study. The youngest was 36 years old while the oldest was 54 years old. The average age was 43 years old. They were all male and were married, with an average household size of five. They were at least elementary graduates. One was able to finish high school. Another one reached high school but did not graduate and the remaining two were elementary graduates.

4.1.4. Lechon Processors

There are currently 14 *lechon* processors in La Loma who were also representatives from each of the firms that were interviewed. Among the 14 representatives from each *lechon* processing firm in La Loma, Quezon City interviewed in this study, the youngest was 26 years old while the oldest was 53 years old. The average age was 42 years. Three respondents (21.43%) were 26 to 35 years old, six were aged 36 to 45 years old (42.86%), and the remaining five were aged 46 to 52 years old (35.71%)

A majority (64.29%) of the processor-respondents were male while the other five (35.71%) were female. Ten (71.43%) of them were married and only four (28.57%) were single. The average household size of respondents consisted of five members.

The highest educational attainment was a doctoral in medicine (7.14%). Six (42.86%) of them were college graduates, five (35.57%) reached college but were not able to finish, and only two reached high school but were not able to finish. These results imply that the demand area was a more urbanized place than the supply area.

4.2. Value Chain Analysis

4.2.1. Producers to Agents

Native hogs backyard producers reared native hogs for about three to four months. When the hogs have reached the marketable weight, they are ready to be collected by the agents. The producers and agents connected with each other through simple telecommunication devices. Most of them have already known each other for a long time. Others were relatives wherein the consignment basis of payment was prevalent. In case that the agents were not closely related to the producers, they paid them cash immediately at the transaction time. Direct interaction was the only means when transacting. Sometimes, it was the backyard producer who called the agent to collect their native hogs which had already reached marketable weight. Sometimes the agents traveled to *barangays* where most of the backyard native hog

producers were concentrated and checked if there were native hogs in the holding pens on the road side that were ready to be collected.

Because native backyard raisers had different cycles of production (different beginning and ending months) there was less competition among them. The producers also did not perceive any competition among them. The agents were willing to collect from whomever as long as the native hogs' relative weights had reached the marketable weight.

Agents to Dealers. Dealers and agents had strong relationships with each other, but just like the producer-agent relationship, they did not have formal contracts that bound them together. They relied heavily on verbal agreement. The mode of communication was through personal contact or through simple telecommunication devices. They also utilized direct interaction for transactions. The people interviewed always mentioned the word *tiwala* (trust) in terms of transacting with each other. Consignment type payment was also prevalent at this chain level. However, based on the interview, dealers would prefer to pay in cash right away in the trading of native hogs.

It was common that whenever the dealer could not deliver the live hogs brought by the agents, the agents would opt to switch to other known dealers. Dealers in the area, on the other hand, had friendly competition with each other, and knew this selling behavior of agents with regards to the disposing of their acquired native hogs. The dealers usually gave cash advances to the agents in order for them to assure the delivery of native hogs. Agents did not work regularly, and dealers had many of them. They did not perceive competition among them since they usually did not transact business with the dealers at the same time and if ever they had something to sell but a dealer had already collected a large number of heads, they could always find another dealer to whom to sell their acquired native hogs. Dealers collected hogs from agents for about three to five days before bringing them to the demand area in La Loma, Quezon City.

4.2.2. Dealers to Lechon Processors

Most of the sources, primarily from Quezon province, were already esta-blished suppliers. Some

were known through referrals while others were just appearing in the place to sell their native pigs by bargaining for prices, especially during peak season in the month of December. The *lechon* processors were the primary market of the native hog dealers. The *lechon* processors did not have high bargaining power towards the native hog dealers. Usually, they would pay only when they had money or if they were to order supplies, so that the dealers would have capital to acquire native hogs from the agents.

Since the native hogs delivered to the *lechon* processors by the hog dealers were from a very far location, they usually tended to buy everything that the dealer brought, despite the price. The *lechon* processors usually set the price. The native hogs delivered in the demand area were processed on the same day that they were delivered. This was done because *lechon* processors would not want to incur additional costs for feeding the native hogs.

4.2.3. Lechon Processors to Consumers

The native hogs delivered and processed were also sold the same day. *Lechon* products were not that marketable after 24 hours. In cases wherein there were unsold units, the unsold *lechon* were cut into large parts and kept frozen in a freezer to be processed as *paksiw* the next day. Most of the time, there were *carinderia* owners who were waiting for unsold *lechon* for them to buy it and process as *paksiw*.

Since *lechon* is typically a luxury good, there are no regular (*suki*) customers for this product. All were walk-in buyers who bought either by whole, single or by kilo. There were times wherein customers ordered in bulk, but these were not retailers; rather, these were consumed on special celebration.

The La Loma *lechon* processors did not regard other processors as competitors. They viewed the industry as a whole for the benefit of all. Although their products were homogenized, they were somehow differentiated in terms of the taste of their sauce. Each had its own recipe and its own unique taste.

4.3. Cost and Return Analysis

4.3.1. Producers

For the lean season, the per unit cost of native hog was Php1,130 (total cost of Php5,650 divided by five heads) and the average per unit selling price was Php1,967. Computing for the margin or value-addition of the producers, it would be Php1,967-Php1,130 = Ph837.

For the peak season, the per unit cost was still Php1,130 during peak months and the average per unit selling price was Php2,083. Computing for the margin or value-addition in pesos, it would be Php2,083 – Php1,130 = Php953. On the average, the native swine producers' monthly profits from native swine raising ranged from Php1,200 to Php1,600. The major cost came from the purchase of initial stocks (88.50%).

4.3.2. Agents

During lean months, agents were able to acquire 20 heads in a month with per unit cost of Php1,940 and an average selling price of Php2,167, generating a value-addition of Php227 per head.

During peak months, the agents were able to acquire 50 heads of hogs with a per unit cost of Php2,114 and an average selling price of Php2,420, generating a value-addition of Php306 per head.

4.3.3. Dealers

During the lean season, the average selling price per head of the dealers was Php2,400 while the cost per unit was Php2200. This generated a value-addition or margin of Php191 per head. Aside from native hogs, the dealers also delivered wood which was bought by the *lechon* processors to be used as charcoal in the roasting activities, inevitably part of the processors' total cost.

During peak season, the number of heads usually ordered by the *lechon* processors averaged 800 heads. Prices were higher compared to the lean season. The average selling price set by the native swine agents during peak season was Php2,900 per head, with a unit

cost of Php2,438 generating a value addition of Php462 per head. The major cost (99%) incurred by the dealers was in the acquisition of live native hogs from agents.

4.3.4. Lechon Processors

Lechon is not an everyday dish and its seasonality is very describable. The lean months were during the months of February, March, April, June, July, August, September, October and November while the peak months were during the months of December, January and May. During the lean season, the average selling price of native *lechon* was Php3,400 while the average

cost was Php3,161 generating a value-addition of Php239 per head.

During the peak season, all of the *lechon* processors (micro, small and medium) were in operation. The average production unit of micro-scale *lechon* processing firms was 120 *lechon*, small-scale firms were processing an average of 230 *lechon* and medium ones processed an average 700 units of *lechon*. The average selling price was Php5,000 and the average cost was Php3,700, generating a value-addition of Php1,300 per head. In general, just like the other chain actors, a majority of the cost incurred by the *lechon* processors was devoted to the acquisition of native hogs.

Fig. 3. Relationship Dynamics between Value Chain Actor Respondents
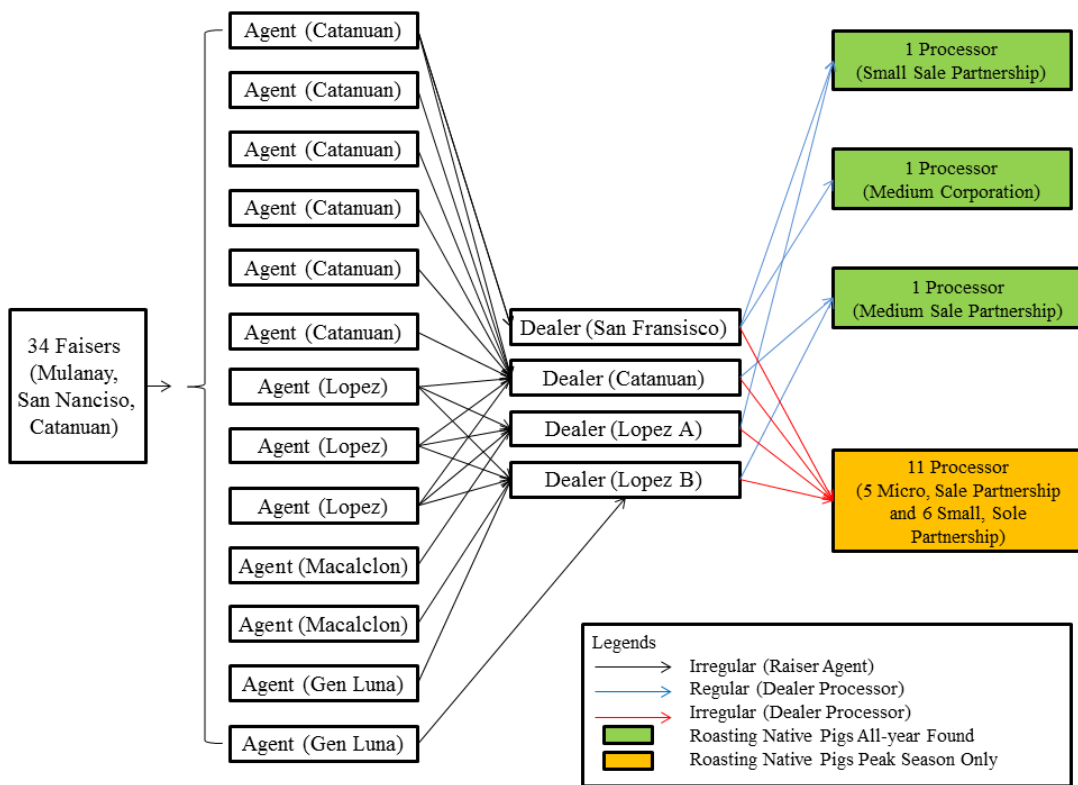
4.4. Value-addition, Marketing Margin and Percent Share

Value-addition or margin per unit is the difference between the selling price per unit and the cost per unit.

Table 1 summarizes the value-added by each of the chain actors during lean season.

Based on the table, value-addition or margin increased as the product moved from the supply area actors to the demand area actors. A large margin difference was observed between the level of agents and dealers in which the average number of product units increased.

Table 1. Summary of Value Added by the Chain Actors for the Lean Season

Chain Actors	Selling Price (Php)*	Cost (Php)*	Value Added (Php)*	Average No. of Units	Total Margin (Php)**
Raisers	1,967	1,130	837	5	1,395
Agents	2,167	1,940	227	20	4,540
Dealers	2,400	2,200	200	200	40,000
Processors	3,400	3,160	239	420	100,380

Note: *per unit, **in a month.

Table 2. Summary of Value Added by the Chain Actors for the Peak Season

Chain Actors	Selling Price (Php)*	Cost (Php)*	Value Added (Php)*	Average No. of Units	Total Margin (Php)**
Raisers	2,083	1,130	953	5	1,588
Agents	2,420	2,114	306	50	15,300
Dealers	2,900	2,438	462	800	369,600
Processors	5,000	3,700	1,300	525	682,500

Note: *per unit, **in a month.

The same trend was observed during the peak season. Table 2 summarizes the value-addition of the chain actors during the peak season.

Just like during the lean season, the lowest margin was observed at the level of the producers whereas the highest margin was at the level of the processor. Relatively, margins in the peak season were higher than margins in the lean season. This time, the large difference in margin was noted at two levels: at the agent-dealer level and at the dealer-processor level.

Marketing margin or the absolute constant margin is the difference between the buying price and selling price. Table 3 summarizes the buying and selling prices of the different value chain actors during the lean season for the different scales of operation.

Table 3. Average Buying and Selling Prices of the Different Value Chain Actors for the Lean Season

Actors	Small[a]		Medium[b]		Large[c]		Average	
	BP (Php)	SP (Php)	BP (Php)	SP (Php)	BP (Php)	SP (Php)	BP (Php)	SP (Php)
Producers	1,000	1,600	1,000	2,000	1,000	2,300	1,000	1,967
Agents	1,600	1,800	2,000	2,200	2,300	2,500	1,967	2,167
Dealers	1,800	1,990	2,200	2,400	2,500	2,800	2,167	2,400
Processors	1,990	2,900	2,400	3,600	2,800	3,900	2,400	3,400

Notes: 1. [a]14-16kg live weight, 6-8kg processed.
2. [b]17-20kg live weight, 10-14kg processed.
3. [c]21-23kg live weight, 16-18kg processed.

Table 4. Marketing Margin, Percent Margin and Percent Mark-up of the Chain Actors for the Lean Season

Chain Actors	Selling Price (Php)	Buying Price (Php)	Absolute Margin (Php)	Percent Margin (%)	Percent Mark-up (%)
Producers	1,967	1,000	967	49.16	96.70
Agents	2,167	1,967	200	9.22	10.17
Dealers	2,400	2,167	233	9.70	10.75
Processors	3,400	2,400	1,000	29.41	41.67

Table 5. Average Buying and Selling Prices of the Different Value Chain Actors for the Peak Season.

Actors	Small[a]		Medium[b]		Large[c]		Average	
	BP (Php)	SP (Php)	BP (Php)	SP (Php)	BP (Php)	SP (Php)	BP (Php)	SP (Php)
Producers	1,000	1,700	1,000	2,100	1,000	2,450	1,000	2,083
Agents	1,700	1,900	2,100	2,500	2,450	2,860	2,083	2,420
Dealers	1,900	2,400	2,500	2,900	2,860	3,400	2,420	2,900
Processors	2,400	3,500	2,900	4,500	3,400	7,000	2,900	5,000

Notes: 1. [a] 14-16kg live weight, 6-8kg processed.
2. [b] 17-20kg live weight, 10-14kg processed.
3. [c] 21-23kg live weight, 16-18kg processed.

Using the average selling and buying prices, the absolute constant margin, percentage margin and percentage mark-up were computed as shown in Table 4.

Based on the table, the processors had the highest absolute margin, followed by the producers. The traders, which were the agents and the dealers, had margin values that were close. In terms of percent margin, the raisers had the highest, meaning they had the highest profit per unit. For the percent mark-up, the producers added on 96.70% of their costs incurred to set their selling price, agents added on 10.17%, dealers added on 10.75 % while the processors added on about 41.67% of their total costs to come up with their selling price.

During the peak season, the prices were generally higher from the farm gate level up through the trading and demand areas. Table 5 summarizes the buying and selling prices of the different chain actors.

Using the average selling and buying prices, the absolute constant margin, percentage margin and percentage mark-up were computed, as shown in Table 6.

Table 6. Marketing Margin, Percent Margin and Percent Mark-up of the Chain Actors for the Peak Season

Chain Actors	Selling Price (Php)	Buying Price (Php)	Absolute Margin (Php)	Percent Margin (%)	Percent Mark-up (%)
Producers	2,083	1,000	1,083	51.99	108.30
Agents	2,420	2,083	337	13.93	16.18
Dealers	2,900	2,420	480	16.55	19.83
Processors	5,000	2,900	2,100	42.00	72.41

Just like during the lean season, the processors had the highest absolute constant margin while the producers had the highest profit per unit. During this season, the raisers added on a percentage that exceeded their total cost to come up with their selling price. In general, it was during peak season that the chain actors were having significant gains in their business operations.

Fig. 4 shows the value chain of native swine processed as *lechon* and the relative percent margin and percent mark-up per unit incurred by the different chain actors.

As shown in the Fig. above, a backyard producer had a higher share of consumer peso during the lean season whereas the middlemen had a higher share of consumer peso during peak season. To measure the

market efficiency of each of the chain actor, the ratio of their absolute constant margin in relevance to the length (in terms of days) in which the product was obtained (live native hogs for the raiser up to the dealer and native *lechon* for the processor) for lean and peak seasons. Based on the results, the *lechon* processors were the most efficient since they can have 29.41% share of the consumer peso in just two days. The least efficient were the producers for raising the native hogs for three months, with 55.88% of the total consumer peso.

For the peak season, the processors were still the most efficient, having a 42% share of the consumer peso just for two days. The producers were still the least efficient in terms of marketing for they had 41.66% share of the total consumer peso in three months of raising.

Fig. 4. Percent Margin and Mark-up of the different Actors in the Value Chain of Philippine Native Hogs Processed as Lechon during Lean and Peak Seasons.
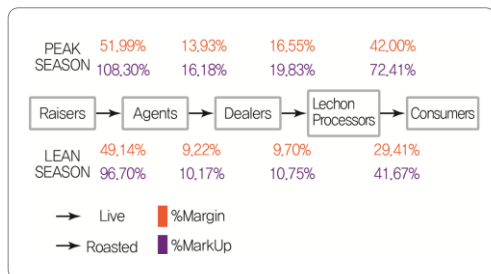
Ⅴ. Conclusion and Recommendation

The existing chains started from native swine production in Quezon province to the *lechon* proce-ssing in La, Loma Quezon City were composed of relatively small players, despite the end product being a luxury good. There was no one cited of large-scale operations and no two players had any formal contract agreements that bound their relationship. Bargaining of prices was prevalent up to the level of selling to the end consumer. The consignment basis of payment was common in the transaction between chain actors, especially at the level of traders and processors.

In general, raisers were responsible for the pro-duction function in the chain. Traders were responsible for the exchange function. Usually, middlemen were regarded as redundant but for this study, they were essential and they were not adding a large mark-up when selling native hogs. They were not to be eliminated unless otherwise there would be consoli-dation between the backyard raisers to form a comer-cial-scale farm. The agents were mainly for the trans-portation function while the dealers were doing both financing and transportation functions. The processors were responsible for the processing, storage, demand creation and selling functions.

In terms of share of consumer peso, the producers had a higher share compared to middlemen (all the other chain actors combined) during the lean season but it was the middlemen who had a higher share during the peak season. In terms of marketing effi-ciency, the following was the order of being most efficient to least efficient during both lean and peak seasons: processors> agents>dealers> producers.

Based on a survey of 20 end consumers, it was found that there was a preference for native *lechon* over ordinary *lechon* among consumers. The signify-cant product characteristics cited were taste, crispiness and sauce. Most of them were familiar with the differences between native and ordinary *lechon* and were willing to pay a higher price for native *lechon*. However, they were not yet familiar with native *lechon* being raised organically.

The problems observed in this study included the following. for the producers: limited supply of initial stock and feed, limited financial capabilities, inade-quate knowledge on disease/animal health manage-ment, limited number of agents during lean months, price fluctuations. For the agents: limited supply during peak season, inadequate financial resource to buy native hog, inadequate knowledge of disease/ animal health management; inconsistent weighing of animals sold. For the dealers: inadequate knowledge of disease/ animal health management, unmet quota for

transporting hogs, difficulty in collecting payments from the agents and processors (no formal contract), long travel time. For the processors: limited supply of quality hogs, shortage of supply during peak season, manpower shortage, poor production system, inadequate quality control system, limited production capacity, seasonal demand for the product, and complexity in business documents processing.

Based on the analysis, it was found that the native backyard producers have an incentive to merge and cooperate as one organization. With this, it will be easier for the government to provide education services if the beneficiaries are centralized. The specific knowledge that the suppliers were in need of improvement as cited by most of the respondents are in the aspects of proper farm management practices, business transactions, proper post-harvest techniques, and breeding techniques. The technology introduced by the government, which was the deep bed system (DBS) can also be maximized in terms of capacity utilization if the farmers are organized and relatively many. They can also be subjected to organic certification if they are organized. Being certified as an organic farm will add value to their product since organically certified products are priced higher. Being organized can also give them a collective power to bargain. As observed in this study, the processors are the ones with the highest bargaining power not only in dictating price but also in payment activities that create a domino effect of non-payment back to the suppliers.

The current style of the support given by the government (specifically by the Department of Agriculture) through extension projects was described as adequate. Its introduction of certain technological practices and equipment has the potential to have ripple effects in the community-beneficiaries where the projects were conducted. This is to avoid a dependency syndrome among backyard producers and other small holders and be able to have incorporate the aim for sustainability in their practices.

Another thing is the suppliers' opportunity in the complement demand for charcoal. The use of wood is now regulated by law as to avoid the cutting of trees.

This is an opportunity to introduce the use of coconut shells as wood fuel, as their location has abundant plantations of coconuts. Delivering coconut shells to be used as charcoal in the demand area will maximize the use of resources for transportation and will add more income to the suppliers.

To fully maximize their resources, they could also raise other animals like cattle and native chickens, in an organic way, and increase their production toward developing a commercial scale operation. Some *lechon* processors in La Loma are roasting cows and chicken also, making it a good opportunity to take advantage of.

Acknowledgement

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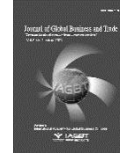
The Effect of Negotiation Strategies on International Trade Negotiation

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ABSTRACT

This study explored the important factors affecting trade negotiations such as environmental conditions, negotiation strategies, the problem-solving approach, interpersonal attraction, time and silent messages including active listening, conversational overlap, facial gazing and touch. The processes of international business negotiations in three different culture groups of Koreans, Americans and Chinese are compared and contrasted. The findings show that the negotiators need to understand cultural differences and negotiations strategies to get the negotiation outcomes they want.

Keywords: negotiation, nonverbal communication, problem-solving approach

Ⅰ. Introduction

The increasing pace of globalization has resulted in an unprecedented growth of commercial relationships among different countries in the world. International business negotiation is a broad conflict management process involving discussion between and among individuals who are interdependent. Business negotiation across diverse cultures is occurring more often today than ever before.

Negotiation is the process by which people attempt to settle what each shall give and take or perform and receive in a transaction between them. Negotiation is a critical business process as it is necessary whenever people are dependent on one another for accomplishing objectives. A lot of international business is done through face-to-face negotiations. International

business partnerships and transactions such as joint ventures, mergers and acquisitions, licensing and distribution agreements and sales of products and services are usually carried out through face-to-face negotiations. As international business increases rapidly under the era and influence of the World Trade Organization (WTO), so does the frequency of business negotiations between negotiators from different countries and cultures. To successfully manage these negotiations, businessmen need to know how to influence and communicate with members of cultures other than their own.

Increasing globalization has resulted in an increased volume of face-to-face negotiations between members of different cultures. Expatriate managers are often required to negotiate with host country residents on a variety of issues such as securing resources, arranging for transportation of goods, and securing and maintaining an effective workforce.

A lot of research studies on cross-cultural negotiations have been done over the last few decades. These studies conclude that people of different cultures use different negotiation approaches. These different approaches include communication style used, persuasion strategies employed and protocols followed. While negotiation studies emphasize possible differences in the way conflict is viewed and managed, little attention had been paid to differences in reacting to cross-cultural conflicts in negotiations. Yet the handling of conflict is critical to any effective cross-cultural negotiations. How the parties respond to conflict also depends on a number of factors including the nature of the conflict, the cultural orientation of the individuals and the affiliation of the parties. It is clear that how the parties perceive, respond to and choose to resolve conflicts is critical to the success of any long-term business relationship.

The purpose of this study is to explore a framework for international business negotiation and to find out how the negotiation strategies of the negotiators from different cultures affect negotiation outcomes.

Ⅱ. Theoretical Background

Social psychological theories (Rubin & Brown, 1975; Sawyer & Guetzkow, 1965; Thibaut & Kelly, 1959) and exchange theories provide the theoretical perspective underlying all the relations among constructs considered in this study. Most recently, the outcomes of business negotiations have been hypothesized to be the result of several factors which can be classified into 3 categories or kinds of theoretical constructs, namely individual characteristics and situational constraints and process measures (Rubin & Brown, 1975). Many empirical measures of both individual characteristics and situational constraints have been tested in this research.

2.1. Environmental Conditions

Grumperz (1979) suggests that humans, while interacting with each other, also provide stylistic signals for interpretation of verbal communications through the use of what he calls contextualization cues. An example of a contextualization cue might be a rise in the tone of voice to indicate or underline an important point. Grumperz and his associates have also found that contextualization cues vary across cultures. These consist of different types of behavior learned in the course of an individual's socialization. Furthermore, he suggests that differences in these cues are often the cause of misunderstandings which can have serious consequences in cross-cultural interactions.

Elements of conversational form that have been found to vary across cultures are legion. For example, Graham (1985) reports Brazilian negotiators appear to engage in more aggressive conversation than Japanese or American negotiators. In simulated negotiations, Brazilians used the words 'no' and 'you' more frequently, the former providing a negative tone, the latter providing a presumptuous tone vis-à-vis the Japanese and American behavior during negotiations. Brazilian nonverbal behaviors also differed from the Japanese and Americans in the sense that there were no silent periods and there were far more interruptions with the inclusion of facial gazing.

A variety of situational factors might act as determinants of outcomes of business negotiations. For example, such factors might be company goals, location, and the number of parties. Culture has been a difficult concept to deal with in any consistent, scientific way. A culture is a configuration of learned behavior and results of behavior whose component parts are shared and transmitted by the members of a particular society (Linton, 1945). The important part of the definition for the present research is the idea that types of behavior are shared by members of a particular culture. According to Spiro (1950), members of a given society behave in uniform and predictable ways. In addition to bargaining behavior being consistent within specific cultures, several authors have suggested that processed negotiations differ across cultures.

2.2. Negotiation Strategy

2.2.1. Problem-Solving Approach

The problem-solving approach (hereinafter referred to as PSA) to negotiations involves first an emphasis on questions and getting information from clients about their needs and preferences. Second, once the client's requirements and circumstances are fully understood, then the negotiator accommodates the offering to the client's needs. The focus is on cooperation and an integrative approach, wherein the needs of both parties are honestly discussed and eventually satisfied. A PAS can be concisely defined as a set of negotiation behaviors which are cooperative, integrative and information-exchange-oriented. Such strategies tend to maximize the number of alternative solutions considered, thus allowing negotiators to optimize outcomes.

The relationship between a problem-solving approach and negotiation outcomes has been frequently investigated during the last twenty years. Different researchers have used various labels for the PSA concept. e.g., integrative bargaining strategies (Walton & McKersie, 1965), cooperative orientation-(Rubin & Brown, 1975; Williams, 1983). Most findings have been relatively consistent. Generally, the PSA has been found to positively influence negotiation outcomes. Graham (1986) investigated relationships between the PSA and the negotiator's individual profit and their bargaining partner's satisfaction. Consistent with several studies reviewed by Rubin and Brown (1975), statistically significant relationships were discovered between a negotiator's PSA and the negotiator's individual profit. Negotiators who encourage partners to provide information about themselves and their needs and preferences can be expected to achieve more favorable negotiation outcomes. Rubin and Brown (1975) and Weitz (1979) suggest the importance of adjusting one's negotiating tactics according to one's impressions of the opponent's negotiation style. Specifically, Weitz suggests that adaptive behavior will enhance negotiating effectiveness. Rubin and Brown (1975) posit that high adaptability coupled with cooperativeness will favor higher negotiation outcomes.

2.2.2. Interpersonal Attraction

In addition to the negotiating strategies, interpersonal attraction such as like or dislike, friendly or unfriendly feeling can strongly influence current negotiation outcomes and the success of future transactions. Williams (1983) suggests the relationship between attraction to a source such as like or dislike, friendly or unfriendly feeling and attitude change has received scant attention. Rubin and Brown (1975) conclude in their review of the negotiation literature that generally interpersonal attraction enhances negotiating outcomes. A negotiating partner's satisfaction has been found to be positively related to a negotiator's attractiveness for business people from France and Germany (Campbell, 1988), from America, Taiwan, Japan and Korea (Graham et al., 1988), and from Canada and from Mexico (Adler et al., 1989). McGuire (1968) explains that when people are attracted to each other, they will make sacrifices (i.e. concessions in a negotiation) to preserve the gratifying relationship. Thus, an individual negotiator may give up economic rewards for the social rewards of a relationship with an attractive partner.

In the very relevant field of buyer/seller interactions, Evans' (1963) similarity hypothesis posits that the more similar individuals are in buyer/seller relationships, the more favorable the outcome will be and the more likely a sale will be clinched. Clopton (1984) argues that perceived similarity results in more cooperation between buyer and seller. Attraction is the mechanism through which similarity affects these outcomes.

It should be noted that interpersonal attraction might be conceived as an exogenous construct-determined before negotiations begin as a part of the combination of the negotiator's characteristics. It may also be argued that attraction is a consequence of the negotiation. However, attraction is regarded as a process-related construct.

2.2.3. Time

In the cross-cultural negotiation literature, the duration of the negotiation is described as a key aspect of the process. For example, Tung (1982) and Van

Zandt (1970) report that negotiations with Chinese and Japanese are exasperatingly long from the perspective of most American negotiators. Pruitt (1981) discusses at great length the pervasive influence of time on negotiations. That is, having a time limit affects the qualities of the aspirations, concession making, and negotiation satisfaction.

2.3. Silent Messages

2.3.1. Active Listening

Active listening as an interpersonal skill is taught and utilized across a wide range of communicational contexts. Its specific definition varies based on the ways that is approached in these various contexts, but generally, it involves listening constructively with a focus on understanding the other person's feelings or on empathizing (Cambria et al., 2002). Active listening is important in the area of conflict resolution and mediation and is understood to be a way of listening and responding to another person that improves mutual understanding (Royce, 2005).

2.3.2. Conversational Overlaps

The concept of interactional synchrony, defined as the unconscious coordination of verbal and nonverbal behavior of two or more participants in a conversation, was discussed at length by Graham (1980). It is the number of conversational overlaps or interruptions during a conversation. Conversational overlaps are defined as periods when both speakers are talking at the same time, or when the conversational contribution of one speaker overlaps that of the other speaker. One possible measure of this construct is the number of conversational overlaps or interruptions during a conversation. Conversational overlaps can be defined as periods when both parties are talking simultaneously, or when the conversational contribution of one speaker overlaps that of the other. Identification of such overlaps is independent of the verbal content of the interactions.

2.3.3. Facial Gazing

Facial gazing is defined as the percentage of time a negotiator gazes at the face of partner. Many researchers have found significant relationships between facial gazing and outcomes of negotiations. Moreover, several authors have suggested differences in facial gazing behavior across cultures.

2.3.4. Touching

Touching means that a negotiator touches another negotiation partner with the exceptions of beginning and ending handshakes. It is the number of times negotiators touch their partners (excluding beginning and ending handshakes). Graham (1985) reports Brazilian businesspeople touch one another during simulated negotiations while Japanese and American negotiators do not.

2.4. Negotiation Outcomes

Researchers often find outcomes of business negotiations difficult to measure and to compare. Various studies have used sale versus no sale, an obvious measure of negotiating effectiveness (Pennington, 1968), profits obtained by negotiators (Rubin & Brown, 1975), and combination of individual and joint profits (Clopton, 1984). Beyond profits, negotiator's satisfaction is an important measure of success, especially if partners desire a continued relationship. Given the dual importance of task accomplishment (profit) and relationship building (satisfaction), especially in international negotiations, the present study uses both as outcomes.

Ⅲ. Methodology

3.1. Hypotheses

H1: A negotiator's individual profit is positively related to his or her negotiating partner's use of a problem-solving approach.

H2: A partner's satisfaction with the negotiation outcome is positively related to a negotiator's use of a problem-solving approach.

H3: A negotiator's use of problem-solving negotiateion strategies is positively related to his or her negotiating partner's use of problem-solving negotiation strategies.

H4: A negotiator's negotiation profit is positively related to his or her use of a problem-solving negotiation strategy.

H5: A negotiator's negotiation profit is positively related to understanding his or her negotiating partner's silent messages

3.2. Methods

In this section, the procedures of the study are presented. First, the sample of business people participating in the research is specified. Next, the laboratory setting is described. Third, data collection instruments are presented.

3.2.1. Sample

The participants in the experiment were 30 Koreans, 20 Americans and 28 Chinese. All of them are working at small and medium-sized trading companies in Korea.

3.2.2. Laboratory Setting

The negotiation simulation developed by Kelly (1966) involves negotiating the prices of three products. Each negotiator was given an instruction sheet, including a price list with associated profits for each price level. The participants were then allowed fifteen minutes to read the instructions (i.e., either a buyer or seller position sheet and appropriate payoff matrix) and plan negotiation strategies. The participants were seated across from one another at a table, given five

final verbal instructions and left alone. When either an agreement was reached or one hour had elapsed, the participants were given the post-game questionnaire.

3.2.3. Evaluation of Study Variables

3.2.3.1. Outcome Measures

Two negotiation outcome measures were considered in this study. Negotiator's individual profits were derived from the negotiation solution agreed to by the negotiators. Partner's satisfaction with the negotiation was measured using a four-item scale (all items were 5-points, anchored by satisfied/dissatisfied, for example) included in the partners' post-game questionnaires.

3.2.3.2. Strategy Measures

Process measures were derived from post-game questionnaires. Each participant rated his/her own negotiation strategies and his/her partner's negotiation strategies on several items (e.g. anchored by solving mutual problems/self-interested). The scales for problem-solving negotiation strategies combine four items from a negotiator's and four items from his/her partner's questionnaires for a total of eight items.

3.2.3.3. Interpersonal Attraction

Partners rated the inter-personal attractiveness of negotiators using a four-point scale (e.g., anchored by comfortable/ uncomfortable).

3.2.3.4. Role of Negotiator

The role of a negotiator as a constraint factor in negotiation was derived by participants who were classified by the seller and buyer.

Table 1. Measures and Descriptive Statistics

Variables	Items	Factor Loading	Eigen Value	Cron-bach Alpha
Strategy Measures	Partner's willingness toward problem-solving	.85298	3.32846	.7819
	Negotiator's willingness toward problem-solving	.86790		
	Degree of negotiator's acceptance	.71072		
	Degree of partner's acceptance	.74995		
	Degree of negotiator's information exchange	.76924		
	Degree of partner's information exchange	.82441		
	Negotiator's prejudice	.69732		
	Partner's prejudice	.70117		
Attraction	Degree of comfort toward partner	.88003	2.31829	.7917
	Negotiation interest	.71926		
	Attitude toward renegotiation	.68910		
	Attraction of negotiation strategies	.76456		
Silent Messages	Active Listening	.64280	2.5462	.7746
	Conversational Overlaps	.75636		
	Facial Gazing	.69886		
	Touching	.78424		
Satisfaction	Satisfaction to agreement	.62608	1.94601	.7218
	Satisfaction to prior anticipation	.78251		
	Satisfaction to the degree of profits	.73408		
	Satisfaction to negotiation process	.69742		

Ⅳ. Results

Hypotheses 1 through 5 were tested by calculating the correlation coefficients. Table 2 presents the results of the hypotheses.

Table 2. Results of Regression Analysis

Hypotheses	Korean	American	Chinese
H1	0.485**	0.132	0.412*
H2	0.414**	0.287*	0.386*
H3	0.371*	0.125	0.327*
H4	0.189	0.402**	0.138
H5	0.316*	0.418**	0.314*

Note: * : $p<0.1$, ** : $p<0.05$.

Hypothesis 1 (H1) stated that a negotiator's individual profit is positively related to his or her negotiating partner's use of a problem-solving approach. H1 received only limited support in this study. It was supported only in the case of Korean and Chinese negotiators. Korean and Chinese negotiators whose opponents use more problem-solving strategies achieve higher profit in the actual negotiation. It is inferred that the negotiators from high context cultures such as Korea and China tend to cooperate with their partners using problem-solving strategies and get good negotiation profits.

Hypothesis 2 (H2) stated that a partner's satisfaction with the negotiation outcome is positively related to the negotiator's use of a problem-solving approach. H2 was supported in the case of three Korean, American and Iranian negotiators. It shows that the more we pursue problem-solving strategies in the negotiation process such as information exchange, the greater a partner's satisfaction in negotiation. We can guess that this kind of problem-solving approach can be an effective negotiation strategy in all three different cultures. As for the degree of relationship, however, Korean negotiators from a high context culture showed the strongest positive relationship.

Hypothesis 3 (H3) stated that a negotiator's use of problem-solving, negotiation strategies is positively related to his or her negotiating partner's use of problem-solving negotiation strategies. H3 was supported in the case of Korean and Chinese negotiators. We can infer that Korean and Chinese negotiators use cooperative strategies if their counterparts use cooperative strategies during the negotiations. However, American negotiators tend to

use their own negotiation strategies regardless of their counterparts' problem-solving approaches.

Hypothesis 4 (H4) stated that a negotiator's negotiation profit is positively related to his or her use of a problem-solving negotiation strategy. H4 received only limited support in this study. American negotiators who were able to make their partners feel comfortable achieved higher profits. The negotiator's use of a problem-solving strategy did not have any effect on negotiation outcomes for Chinese negotiators. This shows that American negotiators using problem-solving strategies for their counterparts can get higher profits as negotiators from high context cultures such as Korea and China tend to concede and expose more information for negotiators from low context cultures such as America.

Hypothesis 5 (H5) stated that a negotiator's negotiation profit is positively related to understanding his or her negotiating partner's silent messages. H5 was also supported in the case of all groups which came from different cultures by showing affirmative relationship between a negotiator's profit and the understanding of their counterparts' silent messages. Specially, American negotiators acknowledging their counterparts' nonverbal communication cues get higher negotiation profits than those of their counterparts from high context cultures.

Ⅴ. Conclusion

The primary purpose of this study was to find out basic factors affecting international business negotiations and to suggest some strategic implications for business negotiators. Along with the advancement of globalization, intercultural business negotiations become more and more important as a marketing strategy. The role of business negotiators is extremely important in order to achieve successful international business negotiations.

In order to achieve agreement in international business negotiations, negotiators are required to manage cultural differences between the parties concerned in addition to the complexity of domestic negotiations. Because such a large variety of cultural factors exist among nations, it is critical for negotiators to identify the kind of problem-solving approaches which are most appropriate for each intercultural negotiator. Understanding cultural differences is vital for successful intercultural negotiations. Objective measurement of culture is important to overcome misunderstanding caused by stereotyping and prejudice about other cultures.

Therefore, implementing negotiation strategies through business negotiations in other countries, particularly the unfamiliar, but fast-growing ones, remains one of the most daunting and interesting challenges facing international business negotiators.

The problem-solving approach is one of the key constructs in the field of negotiation research. It has proven important in our study as a pivotal aspect of negotiation processes in the three cultures. The most important implication of this study is that the problem-solving approach can play an important role in drawing efficient negotiation results.

Korean and Chinese negotiators whose opponents use more problem-solving strategies achieve higher profit in the actual negotiation. The more we pursue problem-solving strategies in the negotiation process such as information exchange, the more a partner's satisfaction in negotiation. Korean and Chinese negotiators tend to use cooperative strategies if their counterparts use cooperative strategies during negotiations. Meanwhile, American negotiators tend to use their own negotiation strategies by their own standard. Also, American negotiators who were able to make their partners feel comfortable achieve higher profits. A negotiator's use of a problem-solving strategy did not have any effect on negotiation outcomes for Chinese negotiators. American negotiators who understand their counterparts' nonverbal communication cues tend to get higher negotiation profits than those of Korean and Chinese negotiators.

To get better negotiation outcomes, the negotiator should understand the cultural background of his negotiating partner as it pertains to business negotia-

tion. Negotiators can ask more questions in their negotiations. Sometimes, it is smart to be a little bit dumb in business negotiations. The more the negotiators ask questions, the more they can get information and they can exchange more information. Also, using silent strategy can be necessary in some instances. Likewise aggressive influence tactics such as warnings and threats, particularly those emphasized with expressions of emotions may be used in negotiations in a very restrictive way.

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