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Work hard as a family business in a peaceful and calm village in early modern Japan.

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Abstract:
Jan de Vries revised Hayami's original theory of the "Industrious Revolution" to make the argument more applicable to early modern commercialization in Europe. But Hayami's original idea might be useful in comparing ecological conditions and forms of development in a global context. The crucial difference between Japan and the West was the development of a rural proletariat in the West. We explore how this difference came to be, and how the Japanese special institution, the *shoya*, affected early modern commercialization. The Japanese case will be compared with Scheilagh Ogilvie's social capital argument regarding the less-developed Germany.

TWO ORIGINAL IDEAS OF THE "INDUSTRIOUS REVOLUTION"

Akira Hayami contrasted the labor-intensive technologies of Tokugawa Japan (1603-1868) with the capital-intensive technologies of Britain during the Industrial Revolution. According to Osamu Saito, Hayami's "Industrious Revolution" theory originally had four parts: (1) There was a transition in Japan from a command economy to a market economy between the 16th and 17th centuries (2) This "commercialization" prompted an increase in population, and a concomitant decrease in land-population rate (3) The decrease of available land changed household formations to smaller units. This process was understood to have prompted development of a "peasant" economy, in which complex kinship family farms with subordinate laborers were changed to simple family farms, where the labor force was limited to members of the immediate family (4) In the process, according to De Vries interpretation, Hayami used the term "Industrious Revolution" "to account for the growth in agricultural output in the last decades of the Tokugawa era that was achieved as peasants adapted their farming methods to substitute increased human exertion for the tractive power of livestock." As Hayami himself explained, "There must have been a conversion from 'horse power' to 'manpower' in rural Japan. The term 'industrious revolution' can be applied to this change … "

De Vries revised the forth of these concepts to make the argument more suitable to early modern commercialization in Europe. He insisted that a fundamental change occurred in the household economy, thus increasing the labor supply for the market. The European redefinition of the "Industrious Revolution" has proponents, who provide empirical evidence of the revolution. Households increased their labor market participation in order to buy new consumer goods with the money earned from their labor. In this European pattern of the "Industrious Revolution", the expansion of work hours was correlated with the expansion of an economy of consumption.

De Vries demonstrated "that historical consumption has been a dynamic phenomenon, charting a far from linear process of change". Most studies of modern economic growth are founded on a 'supply-side' mechanism. The arguments about the "Industrious Revolution" explore a new dimension that is useful for historically comparative studies, placing "the Industrial Revolution in a broader historical setting". The "Industrious Revolution" was "a household-level change with important demand-side features that preceded the Industrial Revolution, a supply-side phenomenon".

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The de Vries's revision opens up a space for a new dimensional argument concerning economic development from pre-modern to modern times. Kaoru Sugihara, Osamu Saito, and the other scholars have expanded his argument. The term "Industrious Revolution" came to mean the "general process of labor-intensive industrialization, which contributed to the non-Western countries to achieve modern economic growth".

Hayami's views were reduced to a simple path towards industrialization. The industrious revolution came to be regarded as "a process of household-based resource reallocations that increased both the supply of marketed commodities and labor and the demand for market-supplied goods". Again, we must remember that Hayami never discussed the transition from the Industrious to the Industrial Revolution. Nor did he focus on the immense labor supply related to the increase of productivity because Japanese "ecological conditions" were more suitable to small family farming, which could bring much more efficiency than a big farm using paid labor.

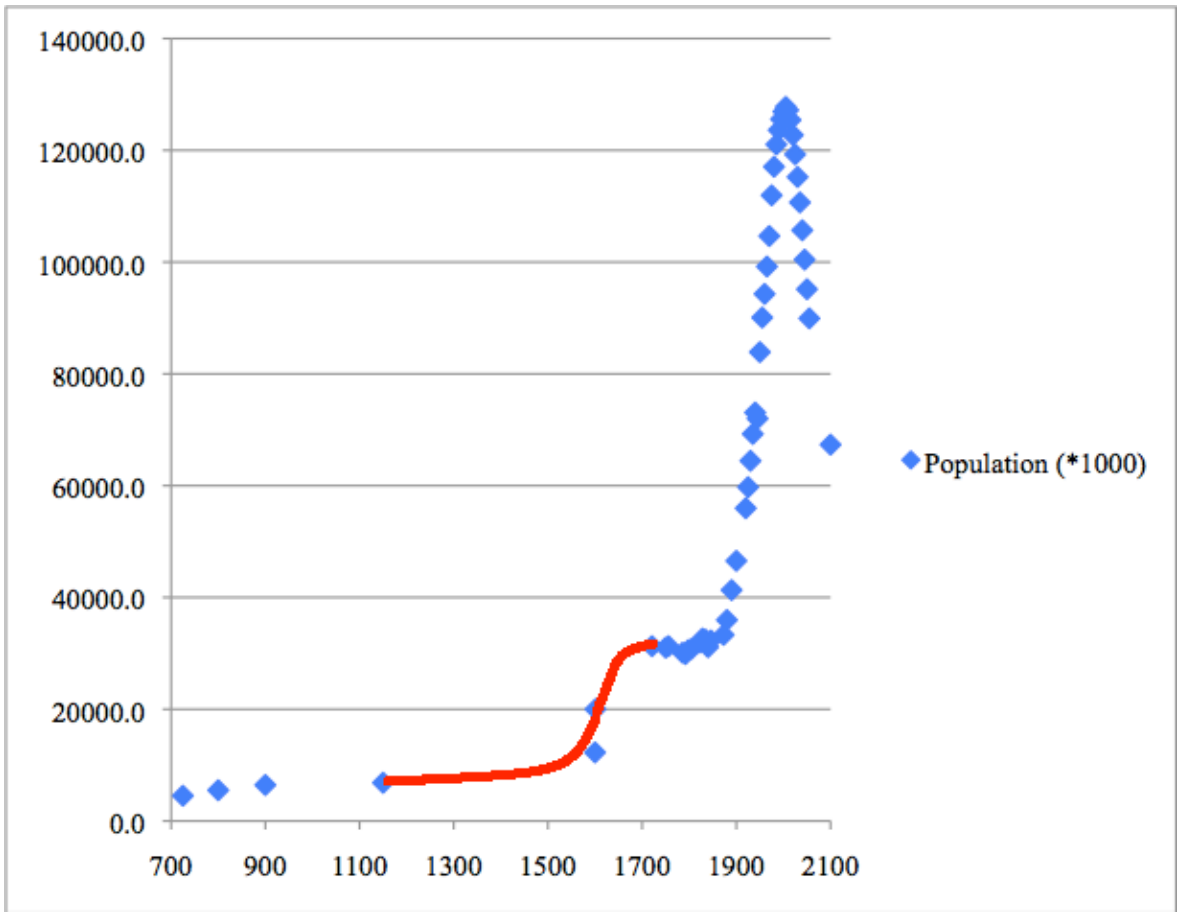

Figure 1. Historical change of Japanese population: Two patterns of estimation

Hayami's original idea demonstrated the existence of another dimension for traditional stage-theory debates on the transition from a feudal to a market economy. The first demographic expansion occurred in 17th-century Japan. Hayami estimated the population of Japan at the beginning of the 17th century to be between 9.8 and 12.0 million; that number then jumped more than 2.3 times to about 26.0 million. The latter number was calculated from the first national population survey, which took place in 1720. The former number, for the beginning of the 16th century, is an estimate,

and is different from another estimate that put the number simply as “less than 20.0 million.”

It is not certain whether there was a drastic population increase in Japan before the 16th and 17th centuries, or a gradual but significant increase in prior centuries. The beginning of the survey of arable lands that investigated the whole of Japan sprang from a political initiative of Toyotomi Hidesyoshi in 1582. The land survey, pursued from 1582 to 1598, stimulated a historical debate in Japan beginning in the mid-1950s. Scholars claimed that the transition from slave to feudal economy occurred because the land survey brought about an institutional revolution in Japan, and an autonomous peasant society was established.

It is now more questionable whether the changes in agricultural land and life were really that drastic. Hayami, meanwhile, characterized the historical change not as a social revolution based on an institutional transition but as a demographic transition caused by the changing processes of household and family labor management. The household constellation changed from “family”, which included not only kinships, but also laborers and servants, to “family” consisting only of intimate kinship relations in the modern sense. The timing and period of this demographic transition was diversified across a wide range. But in either case, whether dramatically or gradually, the increase in population in the 17th century is understandable only in terms of the increase in peasant ‘family’ farming.

Both Japan and Western Europe experienced an increase in industrial and commercial activity in early modern times, but there was a crucial difference in urbanization processes. According to T. C. Smith, pre-modern growth in the West was stimulated by urban growth; in contrast, Tokugawa Japan (1603-1868) lost population in cities and towns in the latter half of the era. De Vries modified this theory of the ‘urbanization’ process in European countries: “While the population remained overwhelmingly rural until the nineteenth century it did not remain overwhelmingly agricultural, at least not if employment is defined by the actual allocation of days of labor rather than by the persistence of a minimal attachment to the land. As the rural population came to be organized into more effective market networks, it acquired a more complex occupation character.”

This is one of the main arguments by which de Vries was able to characterize the “Industrious Revolution” within a global perspective. The crucial difference between Japan and the West was the changing attitude of rural populations who had to seek non-agricultural paid work in rural regions. In the Japanese case, there was no increase in a proletariat composed of rural, paid, landless laborers. Akira Hayami insisted that with the development of individual family farming, all family members had to work harder to gain more yields. All rural people in early modern Japanese villages belonged to existing families, without exception. Almost all case studies of early modern Japanese population registers, such as the ‘Shumon Aratame Cho’, prove that it was extremely rare for an individual to live alone in a village. The question, then, is why was there no proletariat and no solitary people in early modern Tokugawa Japan?

Hayami’s original idea was fundamentally different from de Vries’s, because whereas Hayami’s “Industrious Revolution” was a counterpart of the Industrial Revolution, de Vries regards the Industrious Revolution as only a preparatory phase of the subsequent Industrial Revolution. Could it then be claimed that Hayami’s original concept is no longer useful for discussions of early modern socio-economic and environmental development? The first half of Tokugawa Japan was a successor of the Japanese medieval world, but also an expanding period in which wet paddy fields spread all over the country, bringing about a fundament change in the Japanese landscape. It would be conceivable to call the period Japan’s first ‘ecological revolution’.

Because Hayami’s original concept of the industrious revolution was focused on human labor as an alternative to livestock labor, his arguments can be reasonably extended to environmental issues regarding the relationship between humans and animals. The Industrial Revolution and the subsequent centuries have formed the basis of modern environmental conditions and wrought ecological destruction in the form of dam constructions, highways, atomic energy plants, and so on. However, the history of the development of state capitals, gigantic business interests and multi-national corporations has never been discussed from the perspective of the industrious and industrial revolutions, because the argument has been pursued only within the sphere of labor-intensive industrial-

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ization.

Needless to say, pre-modern societies were not simply based on natural and ecological foundations. Interactions between humans and natural environments have a complex history. The point is that at no point in the debate about the industrious revolution has such an argument been raised. Early modern development of market goods in Europe can be analyzed using probate inventories. Such probate inventories, especially in England and the Netherlands, indicate a proliferation of market goods before the Industrial Revolution. I think probate inventories have also a history. There was a reason why such materials are recorded in history. They were the products of the early modern European world, which preceded an escape from agricultural constraints (Macfarlane 2012). But these significant sources for the analysis of the commercialization process are completely missing from Japanese early modern history.

The property of individuals and families were never officially registered in Tokugawa Japan, even though the economic growth of agrarian productivity was comparable between Japan and the West, as T. C. Smith and Osamu Saito clearly argue. This raises a second question. Scheilagh Ogilvie (2010) analyzed the influence of social capital in early modern Germany, finding it affected the work and consumption behavior of rural inhabitants, especially of women. So in the Japanese case, what effect did a social institution such as the *shoya* system have on early modern commercialization?

A *shoya* was a peasant in an early modern village in Japan; however, *shoya* is also the name for the administrative representative, the headman of the village. In most villages in Japan, the village head and administrator, i.e., the *shoya*, managed the village and kept an administrative diary for the continuity and security of the local governance. Some diaries are available for analysis, and these of Takahama, a village in the Amakusa Islands, Kyushu, Japan, are the primary sources for this paper. Almost all local historical documents, including population registers, correspondence, official letters, and village budgets from the 18th and 19th centuries have been safely stored away and are available today. The position of *shoya* was mostly hereditary, and thus rural historical materials were kept in the house of the *shoya*'s family.

EXPANSION OF THE WET RICE FIELD

Japan has a population of some 127 million people, and that number is expected to fall to 100 million by 2050 and to 64 million by 2100. The fertility problem will change the country. The Japanese population was about 5 million in 725, and increased slowly to 12 million at the beginning of the Tokugawa period, the early modern period in Japan. Japan was then isolated from the world for more than two and a half centuries. From the 16th to the 18th century, the population increased rapidly to 31 million, and then stagnated at around 32 million until the beginning of the Meiji Era.

At the beginning of the 20th century, the Japanese population was about 44 million; by 1950 it had surpassed 83 million, and by 2000, it reached 127 million. In other words, the Japanese population doubled in the first half of the 20th century and tripled over the 100-year period. A 2005 national census found that Japan's population totaled slightly more than 127.75 million, down 19,000 from the year before, which means that the population actually peaked in 2004, two years earlier than predicted. Japan has witnessed a distinctive turning point in the history of its population, from a 20th century of increase to a 21st century of decrease.

The basis for the incredible expansion in the Japanese population up to the beginning of the 18th century was possible in part because agricultural output was able to keep pace, ultimately sustaining a population of 26.0 million people. The population increase was accompanied by a truly dramatic change of landscape in Japan during this period, which could be characterized as an ecological revolution. In Hineno, a village in Kinki region, the wilderness disappeared completely. The wilds were transformed into wet paddy fields that covered the entire area of the village. Two maps for the same area are available from the years 1316 (Showa 5) and 1761 (Horeki 11). This represents a really rare case, in which we can compare the landscapes at a distance of more than 450

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years.

The earlier pictorial map called “Hine-sho Hineno-mura Arano Ezu” (i.e., “a pictorial map of the wilds”) was drawn in 1316 because the expansion of the wet rice fields caused a conflict between a landowner in the village and the village administrator. The development plan was not successfully executed until the second half of the 17th century, when the village inhabitants decided to perform the excavation work. They were able to join ponds and establish an irrigation system for a whole network of villages, including Hineno, Sano, Nagataki and Kamisato. Rivers and ponds were joined both naturally and artificially. The water flows shifted the traditional village landscape from a dependence on rainwater to reliance on the irrigation system, which provided water continuously, regardless of changes in seasonal rainfall. The new irrigation system changed the landscape of the village Hineno quite clearly. The later pictorial map called, “Hineno-mura Igawa Yousui-zu” (i.e., “a pictorial map for Igawa irrigation system in Hineno”), was drawn because of a conflict between the villages of Hineno and Sano in 1761 (Horeki 11). The irrigation system belonged not to individual peasants, but to the villages. This should be recognized as evidence of an ecological revolution, which changed not only ecological settings relating to water resources but also the social relations between villages. The wilds disappeared from the Hineno village. The whole village was covered by wet rice fields.

The 17th century witnessed a huge expansion of wet rice fields in Japan. The new arable lands in the Kaga countryside in the Tokugawa area, for example, were 40% established by 1645 (Shohou 2) and around 78% by 1683 (Tenna 3). The Kanazawa plain, the main living space in the Kaga region, was covered and networked by small waterways and brooks chained with ponds.

Mizumoto argued that this new landscape development had its roots in a “social revolution” that took place from the end of the 16th to the 17th century. He was speaking not of an economic stage of development in the traditional Marxist understanding of transition, but of a new dimension of revolutionary understanding concerning “callings stratification”.

In the late 16th century, warriors were scattered over the land in villages. They served as “overlords, levying taxes, administrating justice, and keeping the peace”. “The normal state” among regional military banded organizations “was war or preparation for war.” War was “the most direct means of increasing territory and thereby increasing strength and security”. The talented leadership of Nobunaga, Hideyoshi, and finally Ieyasu, Tokugawa Ieyasu (1542—1616), unified Japan. Ieyasu destroyed the feudal leagues after a series of institutional changes under the regime of the three leaders; the separation of warriors and farmers, a simple measurement system for land productivity, and isolation and anti-Christian politics brought a new but compromised political structure that managed to keep the peace for two and a half centuries. The new social norms denied the value of individual armed struggles by warriors to protect their own rights and properties. Instead, the legitimacy of a stratified system of callings was instituted. Professionalized business administration belonged to families that were admired and protected as a result. Kawachiya Kasho (1636-1713) described the norm succinctly: “The professional way of warriors, that of farmers, that of craftsmen, that of merchants, and there are also many other professions. If the people work hard along the way of the professionalized “family”, the “family” will be richer, because the way must become main sources for gold and silver.”

Kasho himself had considerable status as a village headman in a suburb near Osaka, an economic center of Tokugawa Japan. He described a social order that brought money to individual families as professionalized households. Another state administrator described additional points of the state policy in the era of Kansei (1624-1644): “First, the peasant family is the basis of the world; second, the peasant should be managed so as not to possess too much, nor to live in scarcity; third, the government should pay to smooth the routes in September and October in order to improve traffic, and never use the people for other purposes. This moral reasoning in politics was based on the belief and trust in the natural laws of heaven. Only a government following the natural laws of heaven will increase the wealth of the world under heaven.”

Okura Nagatsune (1786-1856?) is one of the representatives of a large class of Tokugawa writers who may be called technologists. He was a systematic observer: “wherever he went, he asked ques-

tions of skilled farmers about local soils, seeds, fertilizers, irrigation, and tools, taking down what they had to say and making detailed sketches of plants, tools, and operations." His first book, concerning sericulture, is titled Farm Family Profits (Noka-eki). In the Tokugawa era there were many agricultural inventions that were "the result of centuries of adaptation of farming—of tools, seed, crops, tillage—to local conditions of climate and soil." For example, although "the spade was used everywhere…its size, design, and heft differed almost from village to village."

Nagatsune and other technologists attached enormous importance to technical proficiency in farming. However, "little mention was made of frugality or industry in the farmer, qualities that orthodox Confucian writers harped on (to the neglect of technical skill), clearly not because these virtues were thought unimportant by the technologists but because they were taken for granted." They also, however, "vehemently attacked religion and the idea of fate in its effect on farming," because "results were determined by skill, they insisted, not luck or divine help, and they insisted no doubt because contrary beliefs were widespread." Smith introduced passages from a book on sericulture by an egg-grower in Shinshu: "… Even in good growing years when everyone prospers, yields vary with skill. Although everyone is the same distance from Heaven, it is plain that there are differences in ability (jinriki). People who do not recognize this fact stupidly pray to Buddha and kami, or they blame the eggs for their bad results and envy the success of others." "Industriousness" was taken for granted in professionalized farmers, and accumulated technology was especially admired.

THE DEVELOPMENT OF POLYCULTURE FARMING WITHOUT MEAT PRODUCTION

The peasant family farm and the expansion of new arable lands in the 17th century increased the productivity of rice. The overconcentration on a single crop increased the risk of famine. The first big famine in early modern Japan broke out in 1732 (Kyoho 17) mainly in the West Country. It developed into a serious famine of rice and wheat, and the Kokudaka system, which was the foundation of the Tokugawa regime, failed spectacularly. For example, the land tax delivery from the Ozu han, which had remained stable at an average of 38,000 koku from 1727-1731 (Kyoho 12-16), dropped to 13,000 koku in 1732 (Kyoho 17), about one third. The damage was serious. The severity of the famine prompted a big conversion in agriculture and industry from mono- to polyculture production. Many countries have historical sources and researchers have investigated products available from the middle of the 18th century. The listed diversification of local products provides evidence of the development of a new polyculture.

In early modern Japan, epidemics and famines were the major causes of death; smallpox in particular was a key cause (Table 1). Although the word "famine" does not appear in the diaries of Takahama, "bad harvest," kyo-saku or fu-saku, appears every three years or so, six times over 20 years in the available diaries. In serious cases of "bad harvest," the *shoya* tried to get local governments to reduce taxes. The early modern village people did not generally live in major areas of flooding. Minor flooding was observed as a normal event that did not lead to the deaths of humans or animal.

The Takahama *shoya* also strived to plant sweet potatoes in his village, and to put by a sufficient harvest as a precaution against the possibility of epidemic and other disasters. There was no serious bad harvest during the period of the *shoya* Yoshiuzu Ueda. He played a decisive role in his village by developing the village economy to nourish the inhabitants. He put forth initiatives to develop the fishery and ceramic stone industries, and established a complex commercialized economy.

Takahama's village economy changed remarkably from the end of the 18th to the 19th century. Two large commercial ships (nine-sailed and six-sailed) were introduced, together with an increasing number of small commercial boats, and these supported the commercialized village economy. Fishing and marine production increased in these decades (Table 2). The number of fishing and seaweed boats increased from 12 in 1789 to 58 in 1838. There was also a decisive increase in other forms of transportation; for example, the number of horses increased from 117 in 1789 to 758 in

Table 1. Disasters in Takahama from 1793 to 1818

Year	Bad Harvest	Earthquake	Fire	Flood	Severe Wind	Smallpox**
1793	0	0	0	0	0	2
1794	uk*	uk	uk	uk	uk	uk
1795	0	0	0	0	0	1
1796	uk	uk	uk	uk	uk	uk
1797	0	0	0	0	0	0
1798	0	1	0	0	0	2
1799	0	0	1	0	0	0
1800	uk	uk	uk	uk	uk	uk
1801	1	0	1	1	0	3
1802	0	0	0	0	0	0
1803	1	0	0	1	0	3
1804	0	0	0	2	0	1
1805	0	2	0	0	0	1
1806	1	1	0	1	0	0
1807	0	0	1	0	0	83
1808	0	1	2	0	1	126
1809	1	0	1	0	0	8
1810	0	0	0	1	2	11
1811	uk	uk	uk	uk	uk	uk
1812	0	0	1	0	0	1
1813	uk	uk	uk	uk	uk	uk
1814	0	0	1	0	2	100
1815	0	2	2	0	1	1
1816	1	1	0	0	1	2
1817	0	1	0	1	1	2
1818	0	2	0	0	0	4
Total	5	11	10	7	8	351

*uk=unknown, **= Number of patients, and the others are those of events.
Sources: Ueda Yoshiuzu Nikki

1838 (Table 3). Such a marked increase in the means of transportation was likely one of the results of the commercialization of Takahama. Ceramics stones were original products of Takahama, and excellent stone for ceramic production was mined locally, a practice that continues today. Ceramic stones from Takahama were also exported to famous ceramic production areas in Kyushu for Arita-Yaki (Arita ceramics)

From the basis of the rice subsistence economy, the development of polyculture in Japan during this period produced not only a complex history of commercialization and ecological management, but also a 'second' industrious revolution. New "cropping decisions raised difficult problems of work scheduling, which were in some degree different for each farm family," and required anticipating new work flows for an entire growing season, because "each crop entailed a number of narrowly timed tasks: seed treatment, soil preparation, planting (and often transplanting), repeated and numbered weeding and fertilizations, and so on."

No conversion from 'horse' power to 'man' power took place in Japan. "A recent survey of evi-

dence on this issue has revealed that Hayami's interpretation of the Nobi evidence is questionable, and that the man-cattle ratio varied considerably from region to region, as well as from time period to time period." (Saito 2005, 35) But it is almost certain that many more working hours were nec-

Table 2. Commercial and fishery tax (*"Momme"*= silver coin) on fishing-related commerce in villages of the *Oe* district

Year	1789		1867	
Village	Commercial Tax	Fishery Tax	Commercial Tax	Fishery Tax
Sakitsu	27	465	0	465
Imatomi	0	0	0	0
Ooe	6	40	24	40
Takahama	45	0	177	50
Kozatoko	33	0	42	0
Simotsufukae	18	0	33	0
Tororo	6	0	0	0
Fukuregi	0	0	0	0
Total Amount	135	505	276	555

Sources: Ueda House Archive 4-42; "Sho-unjo-mono narabini Nou-kan-syo-kasegi sono-hoka kakiage-cho (= Tax Registers)", Onoue Monjo, reprinted in Mataji Miyamoto, "Tenryo Amakusa no Shogyo to Tonya", in Kyushu Bunka-shi Kenkyu-sho Kiyou, 2 (1951), 75

Table 3. Increase in the forms of transportation in Takahama

Year	Population	Horses	Cattle	Boats and Ships
1714	1272	109	16	13
1732	1804	134	8	7
1750	2400	135		10
1761	2557	138		10
1768				
1772	2875	125		18
1789	3078	117		12
1804				
1810				
1821	3559			
1838	3638	758		58
1868	3732	632	26	81

Sources: Sources: Ueda House Archive 4-4, -5, -7, -10, -12, -14, -19, 7-78, 12-22, 4-additional-1-2

essary when polyculture agriculture was combined with commercialized industries.

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This busy, full-time farming combined with other industries represents a new type of "industriousness", different from the kind required for concentrated rice production, but also different from the market-oriented "industriousness" described by de Vries. That "industriousness" occurred in Europe first "in those peasants households that could follow the course of specialization by concentrating household labor in marketed food production". Next it was "revealed most clearly by proto-industrial and proletarian households" forced to work "longer and harder". Finally, it was observed in "rural non-agricultural households, seasonal migrants and even urban residents" as "seasonal peaks, and the intensification of agriculture to supply marketed foodstuffs, particularly bread grains, intensified the demand for harvest labor."

Saito (2005) insists that the "Industrious Revolution" in the sense Jan de Vries means never occurred in early modern Japan. There certainly existed a tendency for peasant families to work longer, but they were never willing to substitute the purchase of commodities at markets for the production of those goods at home. "Needless to say, the demand by the farm family for cash incomes increased over time, so did their actual cash earnings and perhaps their cash spending as well. However, it is not unlikely that a substantial proportion of increased cash earnings was used to buy cash fertilizers and other input materials in order to raise yields."

Table 4. Damage due to floods in 1801 (Kansei 13), 1803 (Kyowa 3), and 1817 (Bunka 14)

Floods in Jun 13, 1801			Floods in May 10, 1803			Floods in Jun 6, 1817		
Type	Number	Scale	Type	Number	Scale	Type	Number	Scale
River Banks	8	234 m	River Banks	38	1411.2 m	River and Tide Banks	41	1148.4 m
			Tide Banks	2	63 m			
						River Shelves	14	8,424 m
						Mizu-Hane	4	81 m
						River Weirs	14	1,568 m
Shirasu Banks		360 m	Shirasu Banks	2	270 m			
Rice Fields		99 *a*	Rice Fields	1,118.0 *a*	became river	Rice Fields	346.5 *a*	became river
			Rice Fields	1,287.0 *a*	flooded with water	Rice Fields	693,0 *a*	flooded with water
			Other Fileds		sweet potatos	Other Fileds	198.0 *a*	land slide
			Houses	2	collapsed	Houses	4	collapsed
			Huts	1	collapsed	Huts	3	washed away
			Houses	8	walls collapsed			
						Fishing Boats	16	washed away

*a=100 square meters

Sources: Ueda Yoshiuzu Nikki

Neither cotton nor meat markets were developed in early modern Japan. A market economy fostered by 'industriousness' did exist, but it was much weaker than that in northwestern Europe. Saito (2005) summarized commercialization in Japan compared to that in Europe: "In short, while in north-western Europe both "Smithian" and capitalist forces were at work (with the former being mainly in manufacturing and the latter in agriculture and commerce), Tokugawa growth was nothing but a 'Smithian' process. As a consequence, in the European case, the wealth created through capitalist developments contributed to expanding the 'extent of the market' in the domestic economy, which in turn acted as a factor fostering the further division of labor, whereas the whole

process of Japan's pre-modern growth was somewhat more restricted."

Meat markets failed, and capital investments for livestock occurred only on a small scale for the special production of horses in limited regions such as Morioka. Not only did capital investment for livestock fail in Japan (Table 3), but historical research in various fields regarding the nutrition basket also shows a definitive difference between Japan and the West. The nutrition basket was created for the purpose of comparing living standards internationally. It reveals a clear cultural difference in nutrition patterns, which developed variously along with the art and volume of production. The basic patterns were essentially formed in early modern times.

But to talk about 'industriousness' only in the sphere of markets, especially labor market, limits the discussion. 'Industriousness' in early modern Japan applied not only to commercialized work by family businesses, but also to voluntary and disciplinary work by social management. We turn in the final section to a discussion of this meaning of 'industriousness'.

INDUSTRIOUSNESS AND INDIVIDUALISM

Tokugawa Japan decided in its early stages to reject foreign trade and to opt for isolation. The original rice culture was established in the 17th century, and commercialized polyculturre and family by-employments the following the century. Early modern Japan did not venture into the realm of a carnivorous culture until the Meiji restoration.

Improvement of rice species was especially carefully advanced in Japan; in contrast, the improvement of animal species was briskly advanced in Europe. Of the five main cereals (rice, wheat, millet, foxtail, and beans), at least 500 sorts of rice may have been produced. Species were selected for novelty and introduced from everywhere. The Kaga Domain conducted a product investigation in 1738 (Genbun 3). Takei created a table of rice cultivars in Ishikawa. It is classified into early-, middle-, late-harvest categories in non-glutinous and glutinous types (i.e., six types altogether), and 112 varieties were registered. The art of bearded length of rice rubbing was also especially notable, because it could prevent damage from wild boars.

The irrigated cultivation of rice was the most important, fundamental ecological system in Japanese early modern societies. This is also proven by the case of Takahama. Takahama faces the sea and does not have sufficient arable land for a paddy field capable of supplying the nutritional needs of the villagers. Takahama had a population of 3,413 in 1816 (Bunka 13), but the Kokudaka of the village was only 611 Koku, or 0.18 Koku per capita. In comparison to Takahama, rice production in a village such as Niremata, which in 1812 had a population of 672 (Bunka 2), had a village Kokudaka of 1,570 Koku , a tax that had not changed since 1623 (Genna 9). The ratio was 2.34 Koku per capita. Niremata was located in an extraordinarily fertile but disaster-prone area with flooding risks as a result of being surrounded by the downstream of Nobi's three big rivers, the Kiso, Ngara and Ibi. Takahama could not survive as an agricultural village. Its subsistence was guaranteed only by the development of a complex commercialized economy of sea transportation and export of ceramic stones.

The 26 years between 1793 and 1818 saw three periods of relatively severe flooding, which damaged village infrastructure. The local government, however, provided financial aid to the village population only for the 1803 flood. A comparison of the floods of 1803 (Kyowa 3) and of 1817 (Bunka 14) makes it clear that the 1803 flooding caused much more serious damage to the area's rice production (Table 4). A total of 1,118.0 are (100 square meters) of rice fields were washed away by the river, while and additional 1280.7 are of rice fields were flooded. The damage caused by the 1817 flood was much less significant. The total of 346.5 of broken-down fields in that flood represented only 30% of the 1803 damage, while the 198.0 are of flooded fields filled were equivalent to 54% of the 1803 damage.

It is clear that the key factor in the government's decision to provide support was the damage done to the rice fields. The floods of 1817, which did not prompt any governmental support, washed away 16 fishing boats anchored on the river and damaged a considerable number of water-

related structures such as river shelves, Mizu-Hane (i.e., artificial construction changing streams), and river weirs, but did not seriously damage the rice fields. In principle, the village was expected to manage the damage by itself; however, if the disaster damage exceeded the capability of the village community, and especially if the rice fields were damaged, the government would provide support. Such cases can be traced all the way back to 1708 (Houei 5). Takahama received government relief funds in 1708 (Houei 5), 1709 (Houei 6), and 1713 (Syotoku 3), once between 1716 (Kyoho 1) and 1737 (Genbun 2), again in 1770 (Meiwa 7), and one last time between 1803 (Kyowa 3) and 1804 (Bunka 1).

According to descriptions in diaries, several heavy rains occurring over a period of more than ten days caused the floods of 1803. After a heavy rain on April 29, the diary reported that on May 1st the river was swelling and exceeding its banks, and that several areas along the banks were also damaged. Actual flooding began on May 10 in early morning, and lasted until 2:00 or 3:00 p.m.. Flood damage was assessed immediately, and an outline of the damage is listed in a special document dated May 11.

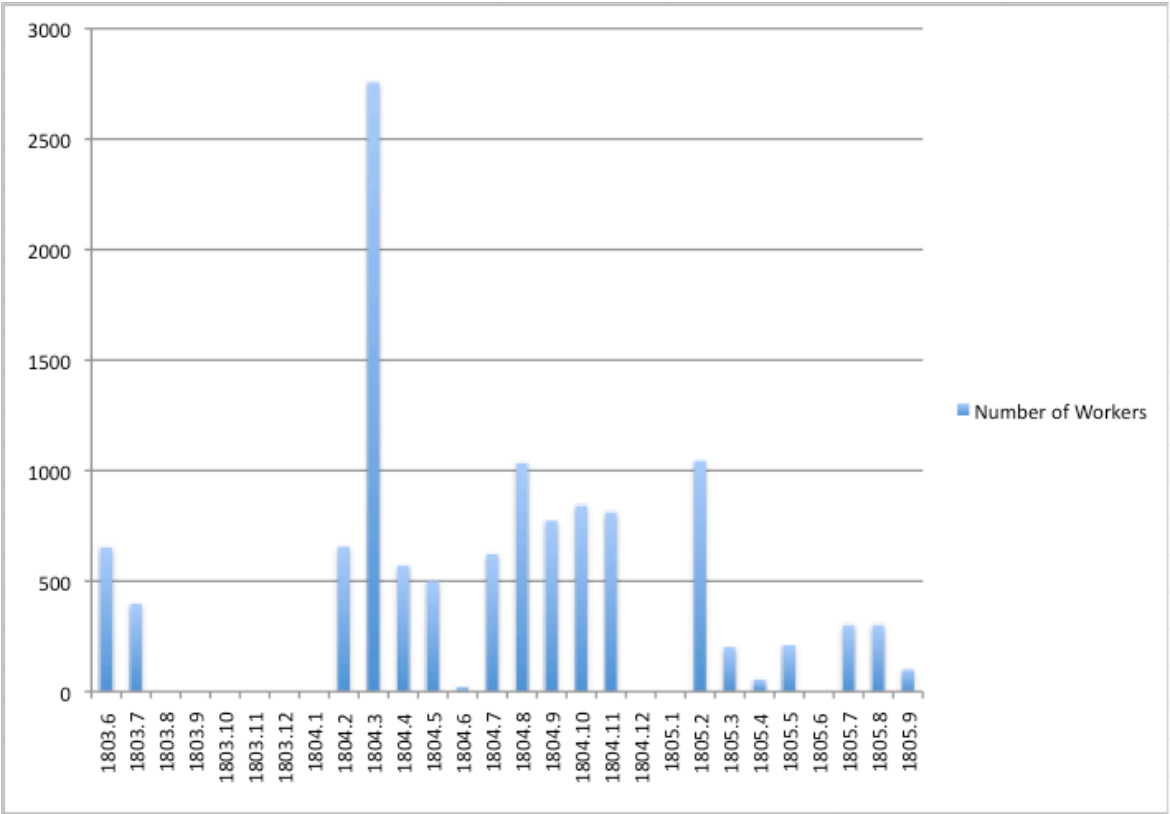

Fig .3. Number of restoration workers from June 1803 to September 1805

In order to prevent the damage from spreading after the flood, an emergency plan was put into effect in June 1803. In February of the following year (1804; Kyowa 4), restoration of especially damaged paddy fields and improvements to the riverbanks and river gates were begun. About 12,000 resident laborers were mobilized in the 27-month-long period between June 25, 1803 (Kyowa 3) and September 10, 1805 (Bunka 2). The diaries describe the number of laborers needed for everyday tasks. The number of accumulated person-days equaled 12,000 (Fog. 3). It is likely that this restoration work was particularly difficult, although the village inhabitants were paid for their efforts. Tasks were planned and organized systematically according to agricultural calendars. The

peak in the number of workers indicates the time for preparing the rice-planting season (Figure 2).

Self-reliance and voluntary management in the villages were the basic principles of disaster management, but reciprocal relief between the villages and government were institutionalized in catastrophic cases. The 1803 floods seriously damaged the agricultural infrastructure, and the government supplied the village with funds for wages, which were paid mostly to village residential workers to reconstruct water-related structures.

This kind of public works for the village was also understood as a sort of "industriousness" in the diary of the *shoya*. The diary uses the word "*Shussei*", which literally means "work hard". *Shoya* used the term often in his diaries, not only in reference to economic businesses, but also in discussing village administrative works, or nursing, or mutual aids. Some inhabitants, who were recognized as particularly hard workers, were awarded with a certain amount of money. Needless to say, it is remarkable that "hard work" was used not only in a productive sense, but also in a wide range of social and private actions.

The *Shoya* Yoshiuzu declared in 1797 (Kansei 9) that "every adult inhabitants should be asked in each district every day as if they are working hard or not, and the results must be notified on a book. Such an administrative work could encourage the children to work hard." "Hard work" had not only a moral but also a practical meaning. The official sanction of "industriousness" seems to have been assumed; only cases of distinguished good workers were recorded with award amounts of money.

In the case of the restoration work for the floods of 1803 (Kyowa 3) the diaries before the work was begun at the end of May that year indicated that a "special award for the distinguished workers should be correctly delivered." "Hard work" was thus the norm in the village. Village inhabitants were officially required to work hard in each family business, including official contributions to the village, and to protect and ensure its tranquility. When Jyunichiro, the son of the retired *shoya*, inherited the village headman position, the local governor sent him and 50 other representatives of the village a message on December 20, 1818 (Bunka 15), which was recorded in this diary: "Work hard in your own family business and for a peaceful and calm village."

CONCLUSIONS

> "The women have much more liberty than perhaps in any other place; they also know well how to make use of it, for they go out dressed in exceedingly fine clothes . . . [England is] a paradise for women, a prison for servants, and a hell or purgatory for horses . . . for the females have great liberty and are almost like masters, whilst the poor horses are worked very hard."
>
> The Duke of Württemberg on his 1598 visit to England

> "… In the ancient world, 'men were … forced to labor because they were slaves to others; men are now forced to labor because they are slaves to their own wants.' As a result, 'in a trading nation every man must turn his talents to account, or he will undoubtedly be left behind in this universal emulation, in which the most industrious, the most ingenious, and the most frugal will constantly carry off the prize'."
>
> Sir James Steuart, Inquiry into the Principles of Political Economy (1767)

> "The farm family consists of the fields, wealth, and heirlooms handed down from ancestors. This property does not belong to us, the living members of the family. We must not imagine it does even in our dreams. It belongs to the ancestors who founded the house; we are only entrusted with its care and must pass it on to our descendants. … There may be events beyond our control, such as flood, fire, or illness, as a result of which the sale of property becomes unavoidable. In that case, we must make every effort by saving and planning to recover what has been sold, make the property whole again,

and pass it on undiminished to our children and grandchildren."
Nogyo Yoshu (a farm manual, 1826)

"If the farm family would escape poverty, it must treat time as precious. By rising early and shortening the daily rest period, two additional hours a day can be worked. That is seven hundred and twenty hours a year: the equivalent of sixty days, or two months, when no food is consumed, no wage paid, no oil required for lighting. … Thus can the farm family escape the pain of poverty, raise itself up, illuminate the deeds of ancestors, and confer blessings on descendants."
Nogyo Mokun (a farm manual, 1840)

These four passages characterize the two kinds of "industriousness" we have examined here, and their differing viewpoints. The first description by the Duke of Württemberg shows the essence of the de Vries view, the freedom of consumers, especially women. The second excerpt from Sir James Steuart explains how "industriousness" is derived from the compulsion of market, which is the argument of Max Weber.

The subsequent two paragraphs from Japanese farm manuals, in contrast, present the idea that farm property belongs not to individuals but rather to families, and should be passed from ancestors to descendants; the purpose of hard work was to escape poverty by pursuing the disciplined use of time necessary for "industriousness".

The competing notions of "industriousness"—the impetus to freely participate in the market versus the obligation to work hard in given callings—seem to have few common elements for comparison. The former notion of "industriousness" fostered commercialization and prepared the ground for the Industrial Revolution. The latter, in contrast, limited the expansion of the markets within the possibility of labor forces in family business.

We began with three open questions:

1. Why did no proletariat and no solitary individuals appear in early modern Tokugawa Japan?
2. Is Hayami's original concept no longer useful in discussing early modern socio-economic and environmental development?
3. In the case of Japan, what effect did a social institution like the *shoya* system have on early modern commercialization?

The pursuit of a family business was the social norm in Japan. It was not the effort of individuals but the professionalized capability of the family that was responsible for the lives of family members and also for the wealth of the village. This was not only the social norm, but also the approach to business management, which could establish and change the constellation of kinship and non-kinship relations. The members of the family were taskforces for the business. Intimate relations within the family were private matters that were not revealed. The division of family properties between individuals was unthinkable. Such family businesses protected the individuals within the family, making proletarianization the exception. The family was a management body; members of the family were expected to work hard within the family's assigned professional calling.

The family system revealed variety and differentiated capabilities between the first and second 'ecological' revolutions, which had their source in the agricultural performance of each village. Environmental diversity engendered the differentiated household system, because the family business tried to pursue the best performance of the family and its labor force constellation. Thus, in answer to the second question, we argue that Hayami's original arguments should be extended to encompass environmental history.

In the comparative view of historical sources, the crucial issue is that historical sources such as "probate inventories" never appeared in early modern Japan. Instead, annual population registers such as the "*Shumon Aratame Cho*", which registered the household or family as a unit, were archived, in many cases for more than 100 years in the house of the village headman. They were a necessary product for human capital management within a village. Smith characterized the household and family priority exactly, asserting that "time was not a personal possession but belonged

primarily to families and, through them, to kin, neighbors, and villages."

The *shoya* in the case of Takahama shows us a successful system of village government conditioned by disciplined family businesses. It was fostered by an ethic of "hard work" and conditioned by the establishment of a subsistence economy. The "Ecological Revolution", the first stage of the "Industrious Revolution" in Japan, was the basis for both fundamentals. The second stage of the revolution, a revised version of de Vries, was much weaker in Japan than in the West. This discussion opens new questions: Was the "Industrious Revolution" in the West, in the sense intended by de Vries, also accompanied by a kind of "Ecological Revolution"? Or, did significant ecological changes in the West occur only after the "Industrial Revolution"? And how can we reconcile our understanding of Keith Thomas's interactive history of humans and nature in the West, and the recent environmental histories in Japan, with the debates about the "Industrious Revolution" as an "Ecological Revolution" in early modern "transition" or "unchanged" area?

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