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**A COMMENT ON NISHIMURA,  
NAKAJIMA, AND KIYOTA'S  
“DOES THE NATURAL SELECTION MECHANISM  
STILL WORK IN SEVERE RECESSIONS?  
EXAMINATION OF THE JAPANESE ECONOMY  
IN THE 1990s”**

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and  
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A Comment on Nishimura, Nakajima, and Kiyota's "Does the  
natural selection mechanism still work in severe recessions?

Examination of the Japanese economy in the 1990s"\*

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**Abstract**

Nishimura, Nakajima, and Kiyota (2005) analyze the entry/exit behavior patterns of Japanese firms during the 1990s and find that relatively efficient (high total factor productivity (TFP)) firms exited while relatively inefficient (low TFP) firms survived during the banking-crisis period of 1996-97. They conclude from this finding that the natural selection mechanism (NSM) apparently malfunctions during severe recessions, but we offer a much more plausible interpretation: the NSM continued to function effectively even during this period, but aberrant banking practices (in particular, "forbearance lending" ("evergreening") and the "forcible withdrawal of loans" and/or the "reluctance to lend") caused a shift in the type of natural selection from "directional selection" to "disruptive selection," with the most efficient (highest TFP) firms as well as the least efficient (lowest TFP) firms being favored and firms of intermediate efficiency and TFP being selected against.

*JEL Classification:* D21, D24, O47, L11

*Keywords:* Total factor productivity, Entry and exit, Natural selection, Directional selection, Disruptive selection, Evolution, Banking crisis, Forbearance lending, Forcible withdrawal of loans, Reluctance to lend, Credit crunch, Recession, Japanese economy, and Japan

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# 1 Introduction

Previous authors have found that the natural selection mechanism (hereafter NSM) of economic Darwinism works well in normal times, but, in an important paper, Nishimura, Nakajima, and Kiyota (2005) (hereafter NNK) analyze the entry/exit behavior patterns of Japanese firms during the 1990s and show that this mechanism apparently did not function effectively during the severe recession of the 1990s in Japan and that relatively efficient (high total factor productivity (hereafter TFP)) firms exited while relatively inefficient (low TFP) firms survived during the banking-crisis period of 1996-97.

NNK's analysis is carefully executed and we do not have any major quibbles with the analysis itself, but we want to offer an alternative interpretation of their results. NNK conclude from their finding that the NSM apparently malfunctions during severe recessions, but we offer a much more plausible interpretation that assumes that the NSM continued to function effectively even during the banking-crisis period of 1996-97 but that there was a shift from one type of natural selection to another as a result of a number of aberrant practices followed by banks.

## 2 Did the NSM Continue to Function Effectively during Japan's Severe Recession?

NNK conclude that the NSM malfunctioned during the banking-crisis period of 1996-97, but they use an unduly narrow concept of natural selection. In this section, we describe three types of natural selection and argue that the NSM continued to function effectively even during the 1996-97 period but that there was a shift from one type of natural selection to another.

In the theory of evolution, there are at least three types of natural selection: (1) "stabilizing selection" which acts against phenotypes at both extremes of the distribution and favors the multiplication of intermediate phenotypes, (2) "directional selection," which acts against only one extreme of phenotypes, causing a shift in the distribution toward the other extreme, and (3) "disruptive selection" (sometimes also called "diversifying selection"), which acts against intermediate phenotypes, creating a bimodal distribution (see Darlington and Mather (1949) and Mather (1953, 1955) for more details).

If we apply this taxonomy to the case of the Japanese economy of the 1990s, our interpretation is that, until 1995, the NSM functioned effectively in Japan and that the Japanese economy exhibited "directional selection," with natural selection favoring relatively efficient (high TFP) firms. Thus, relatively inefficient (low TFP) firms exited and relatively efficient (high TFP) firms survived, as shown by NNK.

However, during the banking-crisis period of 1996-97, banks engaged in both "forbearance

lending” (“evergreening”) and the “forcible withdrawal of loans” and/or the “reluctance to lend” (these two practices are collectively referred to as “credit crunch”), and this caused natural selection to favor firms at both extremes. This caused a shift in the type of natural selection from “directional selection” to “disruptive selection,” but the NSM continued to function effectively even during this period. In what follows, we describe in more detail the aforementioned banking practices and how they led to a shift in the type of natural selection (see Kobayashi, Saita, and Sekine (2002), Ogawa (2003), and Peek and Rosengren (2005) for more details).

“Forbearance lending” (“evergreening”) refers to the practice of banks continuing to lend to less efficient (low TFP) firms to keep them afloat and to thereby avoid the need to declare existing loans to these firms as non-performing. Banks engaged in this practice during the banking-crisis period of 1996-97 because the severe recession and the concomitant collapse of asset prices led to a proliferation of non-performing loans and myopic bank managers wanted to delay writing off those loans until they had retired and received the full amount of their lump-sum retirement allowances, and because the Bank for International Settlements (hereafter BIS) regulations on the capital adequacy of banks introduced in 1993 required banks to meet certain risk-based capital ratios, which created a further incentive for banks to keep non-performing loans off their books. And this practice of “forbearance lending” (“evergreening”) caused relatively inefficient (low TFP) firms to be favored.

However, banks also engaged in the “forcible withdrawal of loans” and/or the “reluctance to lend,” which refers to the practice of banks’ calling in loans to more efficient (high TFP) firms and/or reducing their lending to such firms. Banks engaged in these practices during the banking-crisis period of 1996-97 because the recession and the concomitant collapse of asset prices had reduced bank capital, because banks had to reduce lending to satisfy the newly introduced BIS regulations on the capital adequacy of banks, and because banks had to find some way of securing the funds needed to engage in “forbearance lending” (“evergreening”) to less efficient (low TFP) firms. And the “forcible withdrawal of funds” and/or the “reluctance to lend” acted against firms of intermediate efficiency and TFP and forced some of them to exit.

Finally, the most efficient (highest TFP) firms presumably did not have loans outstanding to begin with, and even if they did, they could repay those loans without having to exit, and moreover, they did not require additional loans to survive. Thus, their survival was not at all threatened by the “forcible withdrawal of loans” and/or the “reluctance to lend.”

Thus, the NSM continued to function effectively even during the banking-crisis period of 1996-97, but aberrant banking practices (viz., the combination of “forbearance lending” (“evergreening”) and the “forcible withdrawal of loans” and/or the “reluctance to lend”) caused natural selection to favor both the most efficient (highest TFP) and least efficient (lowest TFP) firms and to act against firms of intermediate efficiency and TFP, which in turn caused a shift in the

type of natural selection from “directional selection” to “disruptive selection.” This interpretation can explain NNK’s finding that relatively efficient (high TFP) firms exited while relatively inefficient (low TFP) firms survived during the banking-crisis period of 1996-97 just as well as their interpretation that the NSM malfunctions during severe recessions. Moreover, our interpretation seems more plausible than NNK’s own interpretation of their findings because they do not provide a convincing explanation of why a severe recession would ipso facto cause a breakdown of the NSM. Indeed, NNK (p. 74) themselves assert that the combination of “forbearance lending” and the “forcible withdrawal of loans” is a possible explanation of their finding.

### 3 Conclusion

To summarize, in an important paper, NNK analyze the entry/exit behavior patterns of Japanese firms during the 1990s and show that relatively efficient (high TFP) firms exited while relatively inefficient (low TFP) firms survived in Japan during the banking-crisis period of 1996-97. NNK conclude from this finding that the natural selection mechanism (NSM) apparently malfunctions during severe recessions, but we have offered a much more plausible interpretation. Our alternative interpretation is that the NSM continued to function effectively even during this period but that aberrant banking practices during this period (in particular, “forbearance lending” (“evergreening”) and the “forcible withdrawal of loans” and/or the “reluctance to lend”) caused a shift in the type of natural selection from “directional selection” to “disruptive selection,” with the most efficient (highest TFP) firms as well as the least efficient (lowest TFP) firms being favored and firms of intermediate efficiency and TFP being selected against. Thus, it was not that the NSM malfunctioned but rather that aberrant banking practices caused a shift from one type of natural selection to another.

Moreover, the shift from one type of natural selection to another during the banking-crisis period of 1996-97 was induced not by the severe recession itself but by the aberrant banking practices precipitated in part by the severe recession and the concomitant collapse of asset prices and in part by other factors such as moral hazard on the part of myopic bank managers and the introduction of BIS regulations on the capital adequacy of banks in 1993. It was this unique confluence of factors that produced the aberrant banking practices, and it was the aberrant banking practices rather than the severe recession itself that caused the shift in the type of natural selection. Therefore, it is not appropriate to draw sweeping generalizations from the findings of NNK about the applicability of the NSM during severe recessions. It is quite possible that not only does the NSM continue to function effectively during severe recessions in other countries and/or time periods but that there is no shift from directional selection to disruptive selection.

NNK deserve a great deal of credit for their meticulous analysis that sheds light on how the entry/exit behavior patterns of firms changed during the banking-crisis period of 1996-97, but we believe that our interpretation of their findings (that the NSM continued to function effectively but that it changed from one type of natural selection to another) is more plausible than their own interpretation (that natural selection malfunctioned). It thus appears that natural selection is still very much alive and well, even in Japan and even during severe recessions.

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