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## Central Bank Independence in Korea<sup>\*</sup>

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The Bank of Korea Act was revised December 27, 1997 enhancing the legal independence of the Bank of Korea, imposing an inflation-target framework, confining the responsibilities of the Bank of Korea to price stability, and transferring the supervisory function to a separate and newly established Financial Services Commission. The objective of the paper is to place the redesign of the Bank of Korea in the context of financial change in Korea, in the context of international developments in central bank institutional design, and in the context of similar changes in central bank institutional redesign in Japan. As part of this review, the paper evaluates the degree to which the Bank of Korea's independence was enhanced by the 1997 revision and evaluates the practical impact of the revision on central bank policy.

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### 1. INTRODUCTION

The redesign of Korea's financial system has been aggressively pursued since the near collapse of the Korean economy in late 1997. It is too early to determine the success of the redesign effort; however, a wide range of structural changes have been enacted since 1997. Korea appears to be moving in the

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right direction measured by the macroeconomic recovery in 1999 and 2000, though there is concern whether the changes will be sufficient<sup>1)</sup> to establish modern financial institutions and markets to provide a stable financial and monetary framework to support growth in the new century.

The redesign effort included revision of the Bank of Korea Act on December 31, 1997 with the "new" Bank of Korea starting operations April 1, 1998. Appendix 1 identifies key parts of the old and new Bank of Korea Act to illustrate how the new Bank of Korea differs from the old Bank of Korea in terms of policy objectives, transparency, legal independence, and influence of the Ministry of Finance and Economy.

The old Bank of Korea was charged with price stability and ensuring financial soundness in the banking and credit system. The price stability responsibility has been rendered more explicit by imposing an inflation-target constraint on monetary policy. Monetary policy decisions are more transparent under the new Bank of Korea; whereas, the old Bank of Korea provided essentially no meaningful insight into monetary policy formulation and execution beyond usual balance sheet and annual report information. The price stability responsibility is thus strengthened and rendered more transparent under the new Bank of Korea Act. However, the new Bank of Korea is no longer specifically charged with ensuring financial soundness and as part of this reduced responsibility, the new Bank is no longer responsible for bank supervision. Bank supervision and monitoring, which were a major responsibility of the old Bank of Korea, along with staff have been transferred to the Financial Supervisory Commission, a super-regulatory agency established in 1998. The new Bank of Korea, however, can request information from specific banks, require the Financial Supervisory Service to examine specific banks, or request a reconsideration of a decision made by the Financial Supervisory Commission if these requests/requirements are deemed necessary for the Bank's implementation of monetary and credit policies.

The new Bank of Korea is declared to be an independent central bank in the conduct of monetary policy and the role of the Ministry of Finance and

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<sup>1)</sup> Krause (2000) and Samsung Economic Research Institute (2000) review and evaluate the restructuring effort in Korea.

Economy has been significantly reduced in Bank of Korea operations. This is a major departure from the old Bank of Korea; however, the new Bank remains under the influence of the government in terms of shared responsibility for formulating inflation targets, under the influence of the President in terms of appointment of Monetary Policy Committee (Monetary Board under the old Bank of Korea) members, and the Ministry of Finance and Economy still has some avenues of influence, though significantly weakened in the new Bank of Korea Act.

The objective of the paper is to place the redesign of the Bank of Korea in the context of financial change in Korea, in the context of international developments in central bank institutional design, and in the context of similar changes in central bank institutional redesign in Japan. As part of this review, the paper evaluates the degree to which the Bank of Korea's independence was enhanced by the 1997 revision and evaluates the practical impact of the revision on central bank policy. The remainder of the paper consists of six sections. In Section 2, revision of the Bank of Korea Act is placed in context of the events during 1997 starting at the beginning of the year and ending with the December 31, 1997 revision. The paper argues revision of the Act was not a well-thought out process, occurred during economic and financial distress in Korea, was partly the outcome of IMF pressure, and did not reflect the most foresighted concerns of the Ministry of Finance and Economy or the Bank of Korea. The revision process was dominated by the Ministry and rather than reflect a balanced debate about central bank design, the revision process was dominated by intense debate over regulatory responsibilities and staffing. Section 3 places the revision of the Bank of Korea Act in the context of the more general trend to redesign central banking institutions. In this regard, the new Bank of Korea has become more consistent with central bank institutional design in other industrial countries in terms of formal independence, but at the same time, the revised Bank of Korea is at odds with traditional central bank design. In Section 4, the revision of the Bank of Korea Act is compared and contrasted with revision of the Bank of Japan Law, June 11, 1997, which also became effective April 1, 1998. The comparison between the Bank of Korea and the Bank of Japan is predicated on the close relationship between the Korean and Japanese financial systems and the influence Japanese economic and financial institutions have had

on Korea. More important, the policy outcomes of both central banks suggest that formal independence is neither necessary nor sufficient for price stability, though formal independence is more desirable than formal dependence for several reasons. In Section 5, the paper measures the degree of independence achieved by the revised Bank of Korea Act and evaluates the revision of the Act from the perspective of whether the new Bank of Korea will generate improved policy outcomes. Section 6 focuses on a fundamental flaw in the new Bank of Korea act that may offset other positive aspects of the redesign effort. A short concluding section ends the paper.

## **2. REVISION IN THE CONTEXT OF KOREA'S ECONOMY IN THE LATE 1990S**

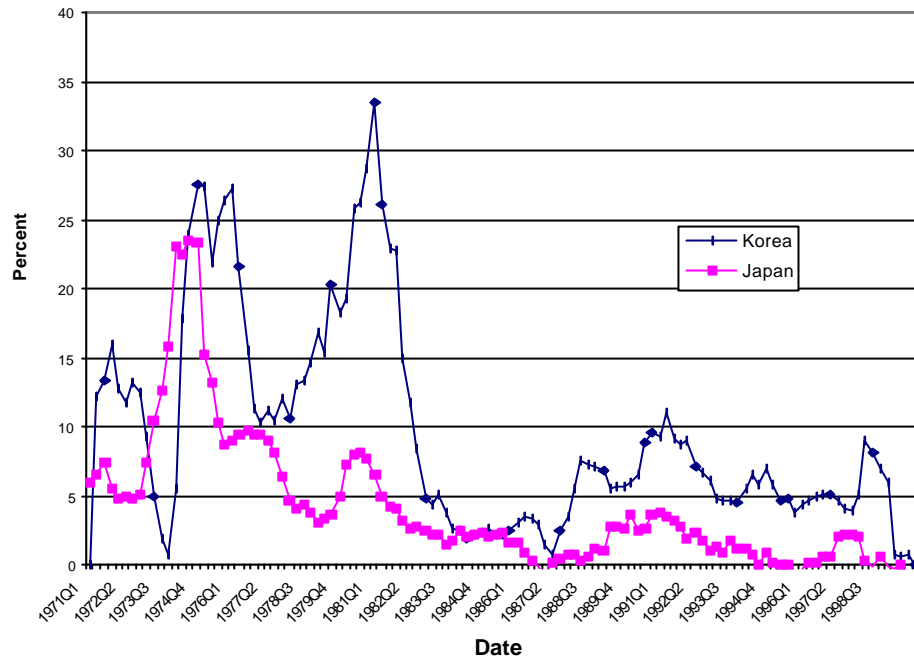
Financial liberalization has been on the agenda in Korea for almost two decades; however, many observers regarded the accomplishments as incomplete through 1997. Financial liberalization was more rhetoric than substance and largely pursued by regulatory authorities to appease international pressure and to secure support for OECD membership. While inefficiencies in Korea's financial system could be identified and there existed a long-standing and large non-performing loan problem in the banking system (Huh and Kim 1994), the overall economic and financial performance of the Korean economy was impressive and hence, regulatory authorities saw little need to shift to a fundamentally different financial regime. As a result, liberalization was incomplete and unbalanced and failed to deal with a large non-performing loan problem and an inefficient banking system.

In January 1997, President Kim Young Sam announced a new initiative to pursue liberalization more aggressively and established the Presidential Commission for Financial Reform. The Commission officially started operations January 22, 1997 with 31 members appointed to represent manufacturing, finance, and academia. The Commission included 15 specialist members representing a wide range of institutions. The overall Commission was coordinated by representatives of the Ministry of Finance and Economy (2 coordinators) and the Fair Trade Commission (1 coordinator). Two reports

were published April and June of 1997. The Commission recommended a broad range of reforms to liberalize and modernize Korea's financial system, including a recommendation to redesign the Bank of Korea. The slow down in economic growth in 1996 and the continuing non-performing loan problem in the banking system were clearly two important motivations for establishing the Commission; however, there was little evidence the Commission sensed a serious impending problem and the Ministry of Finance and Economy's dominance suggested that the Commission recommendations would not likely generate policies to deal with the core problems of the Korean financial system. Forgiveness, forbearance, and delay had been the preferred policy of the Ministry and there was little evidence in the first half of 1997 this approach would be abandoned.

In fact, the only recommendation of the Commission seriously debated in the spring and summer of 1997 was redesign of the Bank of Korea. Central bank institutional design was an important topic, but was one of the least important problems needing attention nor was it a focal point of the Commission's deliberations. The recommendation to redesign the Bank of Korea was motivated by four concerns. First, while the Bank of Korea significantly reduced the inflation rate after 1982 (Figure 1), central bank independence was viewed as a step to further lower the inflation rate. Second, institutional redesign of the Bank toward more autonomy and independence would bring it in line with more independent central banks and reflect a more modern central bank structure consistent with Korea's new status as a member of OECD. Third, central bank independence would be a step in the direction of establishing a more independent private banking system, which even after de-nationalization in the early 1980s, remained dependent on the government. Fourth, institutional redesign of the Bank of Korea was part of an overall redesign of the financial regulatory and supervisory framework.

There were three key elements of the recommended redesign of the Bank of Korea: (i) The Bank of Korea's mission should be defined to include only price stability; however, the Commission did not recommend an inflation-target framework which was added during the discussion of the Commission's recommendations; (ii) the Monetary Policy Board (Board) should become a more separate agency from the Bank of Korea and should be responsible to the

**Figure 1 Korean and Japanese CPI Inflation Rate – 1971:1 to 1999:3**

government; (iii) the supervisory functions performed by the Bank's Office of Bank Supervision, Insurance Supervisory Board, and Securities Supervisory Board should be transferred to a new and separate financial regulatory authority under the Office of the Prime Minister. The "super" regulatory authority or Financial Supervisory Commission would be responsible for broad based supervision, monitoring, and regulation over most of the financial system.

The Ministry of Finance and Economy during the summer and early fall of 1997 focused most of the discussion on central bank institutional redesign and removing the bank supervisory function from the Bank of Korea. The Ministry largely ignored the other recommendations and concerns raised by the Commission regarding the slow pace of liberalization and the non-performing loan problem.

The debate between the Ministry and the Bank of Korea was intense. The Ministry focused on stripping the Bank of Korea of supervisory responsibility and establishing a super agency responsible for overall financial regulation and

supervision. The Ministry's emphasis appeared more concerned with institutional control rather than dealing with the accumulating financial distress in the banking system that had been apparent to most observers since the late 1980s. The Ministry's motives were mixed. On the one hand, the Ministry regarded a super agency as a component of a more modern regulation and supervisory framework, but on the other hand, viewed the removal of the supervisory function from the Bank of Korea as a means to deflect attention from its own policy failure to deal with the accumulating financial distress in the financial system.<sup>2)</sup> Transferring the bank supervision responsibility from the Bank of Korea to a new agency could be presented to the public as a manifestation of the failure of the Bank of Korea to deal with the accumulating distress in the banking system. That is, the Ministry may have viewed the institutional redesign as a way to deflect responsibility for its own policy failures. The position of the Bank of Korea, however, was not much more enlightened. The Bank of Korea viewed the recommendation in terms of regulatory turf, budget, and personnel. The supervisory function accounted for a large number of employees that would no longer be part of the Bank of Korea. Labor union involvement further complicated the issue.<sup>3)</sup>

Overall, both the Ministry of Finance and Economy and the Bank of Korea approached central bank institutional redesign from specific positions of self-interest that did not always consider the best interests of a modern financial system. The Bank of Korea was unwilling to consider the positive aspects of transferring the supervisory function nor the positive benefit of more independence in the context of inflation target in reducing the inflation rate. The Ministry refused to consider the broader recommendations of the Commission and focused only on regulatory turf issues. The debate meant that other and more important issues raised by the Commission were ignored at the very time Korea was entering one of its more unstable periods since 1953. Legislation to restructure the Bank of Korea was proposed by the Ministry of Finance and Economy, but failed because of intense labor union activity and political intervention by the Bank of Korea.

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<sup>2)</sup> The financial and supervisory framework, despite the role of the Bank of Korea, was firmly under the control of the Ministry of Finance and Economy.

<sup>3)</sup> Korea's employment problems are discussed in Fields (2000) and Martin and Torres (2000).

The Asian Financial Crisis and the near collapse of the Korean economy in the last part of 1997 changed the environment and elevated the Commission's evaluation and recommendations to an important platform for structural change. As a condition to receiving assistance from the IMF the Korean government rapidly established a time table for major structural changes in the real and financial sectors and adopted tight monetary policy to limit the depreciation of the won. As part of this time table, the Bank of Korea Act was revised December 27, 1997 and the new Bank of Korea commenced operations April 1, 1998. The Financial Supervisory Commission also commenced operations in 1998 and assumed the bank supervision responsibility previously held by the Bank of Korea. Ultimately, central bank institutional redesign in Korea was not motivated by concern over past policy errors by the Bank, but rather came about as a response to the financial collapse in late 1997 and a desire to restructure the financial regulatory and supervisory framework in Korea.

### **3. REVISION IN THE CONTEXT OF CHANGING VIEW ABOUT CENTRAL BANK INSTITUTIONAL DESIGN**

Central bank institutional design in the 1990s was widely discussed among policy makers and observers. Most of the discussion focused on the degree to which central banks should be legally dependent on government in order to achieve positive macroeconomic policy outcomes. Less discussion focused on the degree to which central banks should have a formal responsibility in the regulation and supervisory framework. However, there was agreement, based on the central bank's lender of last resort powers and role in preventing contagion, that central banks should play an important role in preventing contagion and systemic risk. As a result, central banks should always have complete access to financial information about banks even if they did not have a formal role in the regulatory and supervisory framework and just as important, central banks should have a meaningful role in limiting systemic risk.

Central bank independence has been much discussed ever since the Bullionist debate in the early 19<sup>th</sup> century regarding the Bank of England. Thus, the discussion in the 1990s was not new, but a revisit to an old discussion. The



discussion, however, was motivated by several new considerations. First, the instability associated with inflation in the 1970s and early 1980s and rejection of the Keynesian notion that monetary policy could change the real performance of the economy, focused attention on price stability as the primary objective of monetary policy. Second, consensus was reached by the late 1970s that substantial long-lasting inflation is almost always associated with excessive money growth.<sup>4)</sup> As a result, the issue becomes one of the institutional structure that will best ensure the central bank's technical control over the money supply is most conducive to price stability. Third, financial liberalization in a wide range of developed and developing countries presented an opportunity to reexamine and alter central bank institutions to better achieve price stability. Fourth, Russia's abandonment of the command economy and political independence of the former Soviet Bloc countries provided an opportunity to establish new central banking institutions. Fifth, the continuing movement toward economic integration in Europe and the establishment of the European Central Bank provided another opportunity to discuss central bank institutional design.

Two perspectives on central bank institutional design emerged during the discussion: the traditional approach and the new "equilibrium" approach based on the dynamic interaction between the central bank and the public. The traditional approach suggested that more formally independent central banks would generate lower inflation outcomes than more formally dependent central banks; that is, formal independence was necessary and sufficient to generate price stability. The equilibrium approach, however, suggested that further institutional redesign toward ensuring accountability was needed to achieve price stability. That is, formal independence in the absence of accountability may not generate better outcomes. In this regard, increasing attention was devoted to explicit inflation targeting and other contractual means for ensuring price stability.

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<sup>4)</sup> There remains some controversy over Milton Friedman's famous dictum that "Inflation is always and everywhere a monetary phenomenon"; however, most dispute concerns the extent to which monetary growth may be taken as exogenous. Even by 1975 at the height of the monetarist-Keynesian debate there was a general agreement that a steady and sustained rise in prices must be accommodated by a steady and sustained rise in monetary aggregates.

### 3.1. The Traditional Approach to Central Bank Independence

The traditional view defines central bank independence as formal or legal independence from government and argues that a formally independent central bank will generate lower inflation rates than dependent central banks. The traditional view does not require an explicit accountability mechanism to ensure that central banks pursue price stability, but merely assumes that an independent central bank is more likely to pursue price stability than a dependent central bank. This traditional view found support in a number of empirical studies reporting a high negative and statistically significant association between measures of central bank independence and inflation performance for industrial economies. The most frequently used indexes of central bank independence were provided by Alesina (1988), Bade and Parkin (1982), Grilli, Masciandaro and Tabellini (1991), and Cukierman, Webb, and Neyapti (1992). The Cukierman-Webb-Neyapti (hereafter, CWN) index is the most extensive and regarded as the most complete effort to index the legal relationship between the central bank and the government.<sup>5)</sup>

The literature, however, is not near as conclusive as claimed. The published measures of central bank independence lack precision as illustrated by the low Kendall rank-correlation coefficients and Spearman rank correlations reported in Eijffinger and Haan (1996, p. 25) between four widely used central bank indexes of independence. Close review of the indexes for specific countries such as Japan and the United States suggest the indexes fail to reflect central bank independence in a consistent manner either from a cross section or time series perspective (Cargill, 1995a). Setting aside measurement error, Cargill (1995b) and Fujiki (1996) provide evidence the statistical association is not nearly as robust as claimed. The statistical results are sensitive to changes in time periods, countries considered, and econometric specification. Posen (1995) argues in general the statistical association between central bank independence and inflation performance is an illusion because both variables are correlated with opposition to inflation through the political mechanism.

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<sup>5)</sup> Eijffinger and Haan (1996) review these and other studies on measuring central bank independence.

The traditional view has difficulty explaining the policy outcomes of the Bank of Japan, the Bundesbank, the Federal Reserve, and to a lesser degree, the Bank of Korea. The Bundesbank is frequently cited as an example of the importance of formal independence (DeBelle and Fischer, 1994). Clearly, Germany has both a very independent central bank and a good inflation record; however, average Japanese inflation since the mid-1970s has been about the same as Germany, and its economic performance far better through the late 1980s, despite the Bank of Japan's ranking as one of the least independent central banks by international comparison. The Japanese case (Figure 1) provides a counter example to the conventional wisdom that formally independent central banks are most likely to generate lower and more stable inflation rates (Cargill, 1993). The Federal Reserve, as one of the world's most formally independent central banks, has had a less impressive inflation record than the Bank of Japan. While the Federal Reserve achieved price stability by the mid-1980s, excessive monetary growth was the primary cause of the Great Inflation of the 1970s. Despite formal independence the Federal Reserve conducted monetary policy in the 1970s partly to appease the Nixon and Carter administrations and ultimately allowed the inflation rate to reach 20 percent in early 1980. The Bank of Korea, like the Bank of Japan, provides a counter example to the inflation record of the United States, though not one as dramatic. While Korea experienced high rates of inflation at various times through 1981, monetary policy after 1981 significantly lowered the inflation rate. The relatively higher inflation in the 1989-1992 period was mainly the outcome of labor unrest and not monetary policy. In spite of this, the CPI inflation rate averaged 5.2 percent from 1982:1 to 1997:4 while at the same time, Korea's real GDP grew at 8.4 percent over the same period. This inflation performance is similar to Japan's inflation performance during its High Growth Period of 10 percent per annum real GDP growth (1950s and 1960s), though Korea's inflation rate was more variable and somewhat higher.

Thus, the argument that formal independence is sufficient to ensure long-run price stability does not find robust support among the empirical studies linking measures of independence to inflation performance and more important, is contradicted by the inflation record of the Bank of Japan and to a lesser extent, the Bank of Korea. The Bank of Korea and the Bank of Japan suggest that

formal independence is not necessary for price stability and the Federal Reserve suggests that formal independence is not sufficient for price stability. In addition, a variety of models suggest that even an independent central bank has an inflation-bias; that is, central bank independence is not sufficient for price stability.

### **3.2. Inherent Inflation Bias in the Context of Independent Central Banks**

It can be shown in a formal model that an independent central bank is no guarantee of price stability. The model explains inflation as an "equilibrium" phenomenon without reliance on political influence or central bank misunderstanding about the transmission process of monetary policy.<sup>6)</sup> The problem is that central banks find it difficult to credibly commit to an announced policy consistent with low inflation. The private sector recognizes the incentives facing the central bank to inflate once wage and price contracts are set, and ends up anticipating more expansionary policies. The "equilibrium" secular inflation rate in this case will be too high from a social welfare point of view.

The practical implication of the model is that moderate, or even high, ongoing inflation may be explained by the inability of the central bank to convince firms and wage earners that it won't take advantage of a situation where it could temporarily create an economic boom based on the existence of a short-run Phillips curve. After nominal wage and price contracts have been signed, firms and workers are "vulnerable" to an unanticipated monetary expansion and associated jump in inflation. They know government will have difficulty resisting this temptation, at least when the inflation rate is below a certain threshold, since it wants to increase output and lower unemployment. Without a way to commit the central bank to a particular low-inflation policy stance, the private sector will expect an inflation rate which is just high enough so that the government has no incentive to increase it further, i.e. where the costs of more inflation are balanced by the perceived benefits of the output gain.

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<sup>6)</sup> The formal argument was developed by Kyland and Prescott (1977) and has been summarized in a number of places; for example, Cargill, Hutchison, and Ito (1997, Chapter 8) provide a summary of the formal argument presented in the appendix 2.

A number of proposals have been advanced to solve the inflation bias problem. The traditional solution is to forego discretionary policy and adopt a monetary rule (e.g., Friedman, 1959) in which case, central bank formal dependence or independence is irrelevant. The monetary rule, however, is simplistic and fails to consider the problems in measuring the money supply in an environment of rapid financial innovation. A second solution is to delegate authority to a conservative and independent central banker (Rogoff, 1985). Rogoff's conservative central banker dislikes inflation more, and places less value on output gains, than normally associated with the government (ruling political party or administration in office). The problem with this approach is that it focuses on preventing inflation and fails to consider the bias toward deflation that a conservative central banker might bring to policy. A third solution relies on reputation and requires central bank independence. By acting consistently over long periods, central banks or governments build up a reputation that cause the private sector to believe their announced commitment to price stability. Once a reputation has been built up, and expectations of inflation are in line with announced low-inflation policy, there may be an incentive to inflate but it will come at the cost of lost credibility and higher future expected (and realized) inflation rates. The problem with this solution is that it relies on personalities and assumes the central bank can always defend its position against political pressure.

The three solutions are either simplistic (monetary growth rule) or provide no explicit accountability standard (conservative central banker or reputation of the central bank) to guide policy. Recognition of these short comings motivated another solution in the 1990s that is an extension of the Friedman type of rule approach to monetary policy. This solution emphasizes the importance of explicit contracts between the central bank and the government along the lines of the New Zealand experiment (Walsh, 1995); that is, the independent central bank is constrained by an inflation target but has full authority to pursue that target. The inflation target framework imposes accountability of the central bank, provides the central bank with operational independence, and ensures that the central bank will prevent both inflation and deflation.<sup>7)</sup>

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<sup>7)</sup> See Bernanke, Laubach, Mishkin, and Posen (1999) for a general discussion of inflation

### 3.3. Independence is still the Preferable Institutional Design

While central bank independence alone will not generate price stability, central bank legal independence provides an institutional foundation for further redesign focused on accountability. First, reasonable solutions to the inflation-bias are more compatible with an independent than a dependent central bank in that central bank independence itself is likely to contribute to a greater public acceptance that a price stabilization policy will be followed. Second, central banks need the legal authority to take a stand, either in private or public, against the government if inflationary monetary policy or bailouts of troubled financial institutions are being advocated. Some system of check and balance is needed in the conduct of macroeconomic policy, and the central bank has more credibility with the public, than most other government agencies to provide that check and balance. In general, governments and ministers appointed by the government are more likely than central banks to be influenced by short-run considerations either to exploit the short-run Phillips curve to maintain or enhance political power. It must be emphasized, however, that independent central banks are not immune from incentives to depart from price stability and to use lender of last resort powers to bailout troubled institutions. However, central banks, by their nature and their history, are more likely to take a long-run view than agencies more directly related to the political process.

The inflation-bias problem remains, however, with an independent central bank. Inflation targeting offers a solution to provide the central bank with a long-run anchor to gain public acceptance and limit government influence on monetary policy and lender of last resort services. It focuses central bank policy on price stability and thereby prevent inflation as well as deflation.<sup>8)</sup> In this regard, the explicit contract approach introduced in Canada, Korea, Sweden, and New Zealand shows much promise; however, it is too early and there are too few cases to assess how the contract approach works in practice.<sup>9)</sup>

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targeting.

<sup>8)</sup> Price level targeting was successfully used in Sweden during the 1930s to prevent deflation (Berg and Jonung, 1999).

<sup>9)</sup> See Blejer, Ize, and Werlang (2000) for a recent assessment of inflation targeting in practice.

#### **4. INDEPENDENCE IS NEITHER NECESSARY NOR SUFFICIENT FOR PRICE STABILITY**

The Bank of Korea Act and the Bank of Japan Law were both revised in 1997. The redesign of the two central banks have elements in common. First, they share a common historical evolution. The old Bank of Japan and the old Bank of Korea were part of a financial regime based on the bank-finance model, bank-firm relationships, mutual support, non-transparency, and limited bankruptcy. These characteristics, despite over two decades of official liberalization policy continue to define core elements of both financial systems. As a result, both central banks were designed to support these characteristics and since the financial system was viewed as an instrument of industrial policy, central bank policy was viewed also as an extension of government. In particular, central bank policy was responsible for the traditional goal of price stability, but conditioned upon exchange-rate objectives, supporting selected sectors of the economy, and limiting bankruptcy. Second, the Bank of Korea and Bank of Japan were formally dependent on the government and in particular, the Ministry of Finance and Economy in Korea and the Ministry of Finance in Japan, respectively. Of the published studies ranking the legal independence of central banks, only the CWN study provided an index for both the Bank of Japan and the Bank of Korea. Both central banks were ranked at the bottom of all 72 countries considered in terms of legal independence. Third, despite legal dependence, the Bank of Japan achieved inflation policy outcomes for much of the postwar period that attracted worldwide attention, especially during the 1975-1989 period. The inflation rate in Korea was less stable and experienced more periods of high inflation compared to Japan, but after 1981, the Bank of Korea was able to significantly reduce the inflation rate despite a high rate of real GDP growth. The Bank of Japan, and to a lesser extent the Bank of Korea, illustrate cases where formal independence is not necessary for price stability. Fourth, central bank institutional redesign in both countries was not the outcome of a long-debated and carefully considered process. While in both cases, there was an interest in bringing each central bank in line with the more common independent institutional design for most industrial countries, central bank redesign was not rooted in concern over past failures of monetary policy in either

Korea or Japan. While the Bank of Korea had not achieved a low inflation rate by international standards, the Korean economy had achieved a higher rate of real growth than most countries. Policy failures of the Bank of Korea were not a prominent feature of the discussion over revision of the Bank of Korea Act. Revision of the Bank of Korea Act and the Bank of Japan Law were politically motivated for other reasons. In Korea, the Ministry of Finance and Economy was more concerned with restructuring the regulatory and supervisory framework, which required revision of the Bank of Korea Act. In addition, revision of the Act and the transferring of the bank supervisory responsibility from the Bank of Korea gave the appearance that the Bank of Korea was responsible for the accumulated financial distress in the Korean banking system; that is, it was a convenient way to deflect criticism of the Ministry of Finance and Economy. In Japan, the Hashimoto government initiated the revision process at odds with the Ministry of Finance<sup>10</sup>; however, the Ministry of Finance became an active supporter of independence as a means to deflect attention from its failure to manage and resolve the financial distress in the first half of the 1990s (*Wall Street Journal*, 1996).

The new Bank of Korea and the new Bank of Japan, however, have not evolved in the same manner since April 1, 1998. Bank of Korea policy has focused on achieving a positive inflation rate. In the Monetary Policy in 2000 report published by the Monetary Policy Department of the Bank of Korea, the targeted CPI inflation rate for 2000 and 2001 onwards was  $2.5 \pm 1$  and 2.5 percent, respectively. After raising interest rates significantly in late 1997 and early 1998 as part of the IMF austerity requirements and as part of the effort to limit won depreciation, the economy recovered. Real GDP declined 6.7 percent, but increased 10.7 percent in 1999. The unemployment rate, after reaching a high of 8.6 percent in March 1998, declined to 3.6 percent July 2000. The current account, which had been negative in 1995, 1996, and 1997, was positive in 1998 and 1999. The Producer Price index declined 2.1 percent in 1999, but increased at around 2.5 percent in the latter part of 2000. The consumer price index did not decline, though the rate declined in 1999, and by the latter part of

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<sup>10</sup>) Cargill, Hutchison, and Ito (2000) provide a detailed discussion of how central bank independence was achieved in Japan.



2000, consumer prices were increasing about 2-3 percent. Bank of Korea policy is contributing importantly to the macroeconomic recovery of the economy after the Asian Financial Crisis of 1997. First, the actual inflation rate has been reduced and second, the inflation target provides a constraint to ensure a positive inflation rate and prevent price declines.

The experience of the new Bank of Japan, however, has been different. While the Bank of Korea was not a focal point of criticism during the 1990s nor considered the cause of the sharp downturn in late 1997 and early 1998, the Bank of Japan was intensely criticized starting with policy during the "bubble" phase of the Japanese economy in the second half of the 1980s. The Bank's decision in May 1989 to raise the discount rate initiated the collapse of asset prices. Many argued the decision was taken too late, and that the Bank of Japan's focus on limiting yen appreciation in the second half of the 1980s accommodated asset inflation and made it difficult for the Bank of Japan to achieve any type of soft landing in 1989. The Bank of Japan was criticized for overly tight policy in the first half of the 1990s. Once policy shifted to ease after 1994, the Bank of Japan was criticized for not more aggressively increasing monetary growth and reversing the downward movement in prices (Alexander, 1999; Bernanke, 2000; Cargill, Hutchison, and Ito, 2000; Meltzer, 1999; and Posen, 1998). The Bank of Japan defended its actions in the late 1990s (Okina, 1999a and 1999b), arguing it pursued the appropriate expansionary policy by targeting interbank rates to almost zero from February 1999 to August 2000 and that no other policies were viable. The Bank of Japan argued that "non-standard" policies such as purchasing long-term government bonds would not improve the situation and would be fiscally irresponsible. The Bank of Japan ended its near zero-interest rate policy by raising the targeted call rate from essentially zero to 0.25 percent August 2000, but has again come under intense criticism in early 2001 because of evidence the Japanese economy was slowing. Real GDP declined at an annual rate of 2.4 percent in the third quarter of 2000.

The performance of the Bank of Japan in the late 1990s is interesting from at least two perspectives. First, the zero interest rate policy from February 1999 to August 2000 is unique and failure of the Japanese economy to respond to monetary policy rekindled debate over the "liquidity trap", which

has been dormant since the 1960s. The liquidity trap concept was used to explain why expansionary monetary policy in the 1930s, especially in the United States, failed to reverse the decline in economic activity. Second, Bank of Japan policy shows that formal independence is not sufficient for price stability, which means preventing deflation as well as it does preventing inflation. Despite achieving formal independence in 1998, the Bank of Japan has permitted a slow and gradual decline in the price level that has adversely impacted the economy and prevented recovery. While formal independence may be preferred for reasons stated above, formal independence without accountability is undesirable.

There has been considerable pressure on the Bank of Japan to adopt an explicit inflation target framework; however, to date, the Bank has resisted this pressure claiming that an inflation target is not required, failure to achieve the target would weaken the credibility of the Bank of Japan, and the Bank would lose independence. At the same time, the new formal independence of the Bank of Japan has not provided price stability. In fact, it has made the Bank of Japan more resistant to outside criticism because from the Bank of Japan's view, any perception the Bank of Japan would be willing to change policy in response to outside criticism, especially from the Ministry of Finance, would be viewed as inconsistent with its new found independence.<sup>11)</sup> The irony is that such resistance may ultimately result in a loss in formal independence, much like what happened to the Federal Reserve<sup>12)</sup> for its unwillingness to adjust policy to outside criticism during the 1930s.

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<sup>11)</sup> Cargill, Hutchison, and Ito (2000) refer to this resistance as an "independence trap" and attribute it to the fact that independence came to the Bank of Japan in a serendipitous manner which in turn, accounts for an overly conservative approach to policy by the Bank.

<sup>12)</sup> See Cargill (2001) for a discussion of the Bank of Japan and the Federal Reserve and a list of related studies on the Federal Reserve in the 1930s.

## 5. INDEPENDENCE OF THE BANK OF KOREA AND INFLATION OUTCOMES

Revisions of the Bank of Korea Act was not motivated primarily by a need to correct past policy failures on the part of the Bank of Korea to maintain price stability. The average inflation rate from 1971:1 to 1981:4 is 17.0 percent based on data presented in Figure 1. High inflation in 1980 and 1981 combined with a trade deficit and declining economy was a prime motivation for the starting of liberalization in Korea. The first stage of liberalization focused on macroeconomic recovery. In terms of price stability, this was accomplished in a short period of time. By 1983, the CPI inflation rate was reduced and a lower inflation rate<sup>13)</sup> had been maintained through 1997. Average CPI inflation from 1982:1 to 1997:4 was 5.2 percent, though the inflation rate had reached higher levels in the late 1980s and early 1990s. Since 1997, the inflation rate has declined to the 2 to 3 percent range.

This new monetary regime of lower inflation after 1982 was achieved without any significant change in the institutional design of the Bank of Korea. The Bank of Korea remained dependent on the Ministry of Finance and Economy. The Bank of Korea however, like the Bank of Japan, illustrates a basic point of this paper that formal dependence or independence is not always a reliable indicator of central bank policy outcomes. The average inflation rate over the 1982:1 to 1997:4 period of 5.2 percent is lower than the inflation rate that would have been predicted from standard regressions between CPI inflation and measures of central bank independence. The CWN index for Korea is 0.27 based on a scale from 0 (most dependent) to 1.0 (most independent). The following regression reported in Cargill, Hutchison, and Ito (2000, p. 110) was estimated for 18 industrial countries (excluding Korea and Japan) over the 1976 to 1996 period.

$$\begin{aligned} \text{CPI Inflation} &= 9.10 - 7.54 \text{ Index} \\ R^2 &= 0.93 \end{aligned}$$

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<sup>13)</sup> The measured CPI inflation rate overstates the “real” inflation rate because of well-known biases in constructing CPI values. The bias is generally estimated to be about 1 percentage point.

The index value for Korea of 0.27 predicts an average inflation rate of 7.06 percent which is considerably higher than the actual inflation rate of 5.2 percent from 1982 to 1997.

The revision of the Bank of Korea Act can be considered from three perspectives in the context of the central bank independence index methodology. First, what is the index value for the new Bank of Korea; that is, did the Bank of Korea enhance its legal independence? Second, will the new Bank of Korea likely generate better price stability policy outcomes than the old Bank of Korea? Third, how important is the inflation targeting framework that is now part of the institutional design of the Bank of Korea? Fourth, will the shift of bank supervision responsibility to the Financial Services Commission impact monetary policy outcomes?

### **5.1. The New Bank of Korea Index**

Table 1 presents the computations for the old and new independence index based on the CWN method. The CWN computation is based on their interpretation of the old Bank of Korea Act and the new values are based on the author's interpretation of the new Bank of Korea Act. The two major differences are criterion 2a and 3. The value for 2a (who formulates monetary policy) is increased from 0.33 to 0.83 because an inflation target limits the ability of anyone to influence monetary policy inconsistent with the policy target, the policy target is public, and the Act implies that the Bank of Korea and the government have equal input into determining the inflation target. If the Bank of Korea (or Monetary Policy Committee) has less than a 50 percent influence, however, the assigned value of 0.83 overstates the independence of the new Bank of Korea. The value for criteria 2a is also increased because of the reduced role of the Ministry of Finance and Economy in the policy formulation process of the Bank of Korea. The value of criterion 3 is increased from 0.6 to 0.8 because the objective of price stability is more explicitly defined and transparent and imposes accountability on the Bank of Korea.

The combined effect of the two changes is to increase the measured independence index from 0.27 to 0.33, which is not as significant an

**Table 1 Revised Bank of Korea Independence Index**

	Unadjusted Weight	CWN or Old Values	New Values	Adjusted Weight	CWN or Old Index	New Index
<b>1 Chief Executive Officer (CEO)</b>						
1a: Term of office	0.0500	0.2500	0.2500	0.0500	0.01250	0.0125
1b: Who appoints?	0.0500	0.2500	0.2500	0.0500	0.01250	0.0125
1c: Dismissal for reasons unrelated to policy	0.0500	0.8300	0.8300	0.0500	0.04150	0.0415
1d: Can CEO hold other government positions	0.0500	0.5000	0.5000	0.0500	0.02500	0.0250
<b>Total for Criteria 1</b>	<b>0.2000</b>			<b>0.2000</b>	<b>0.09150</b>	<b>0.0915</b>
<b>2 Policy formulation</b>						
2a: Who formulates policy?	0.0500	<b>0.3300</b>	<b>0.8300</b>	0.0750	0.02475	0.0623
2b: Who has final word in resolution of conflicts?	0.0500	na	na			
2c: Role in government's budget process	0.0500	0.0000	0.0000	0.0750	0.00000	0.0000
<b>Total for Criteria 2</b>	<b>0.1500</b>			<b>0.1500</b>	<b>0.02475</b>	<b>0.06225</b>
<b>3 Policy Objectives (Criteria 3)</b>						
	0.1500	<b>0.6000</b>	<b>0.8000</b>	0.1500	0.09000	0.1200
<b>4 Limitations on lending to government</b>						
4a: Advances for unsecuritized lending	0.1500	0.0000	0.0000	0.1579	0.00000	0.0000
4b: Securitized lending	0.1000	0.0000	0.0000	0.1053	0.00000	0.0000
4c: Terms of lending	0.1000	0.3300	0.3300	0.1053	0.03474	0.0347
4d: Potential borrowers from bank	0.0500	0.0000	0.0000	0.0526	0.00000	0.0000
4e: Limits on central bank lending	0.0250	na	na			
4f: Maturity of loans	0.0250	0.6700	0.6700	0.0263	0.01763	0.0176
4g: Interest rates on loans	0.0250	0.2500	0.2500	0.0263	0.00658	0.0066
4h: Central bank prohibited from purchasing or selling government debt in primary Market	0.0250	0.0000	0.0000	0.0263	0.00000	0.0000
<b>Total for Criteria 4</b>	<b>0.5000</b>			<b>0.5000</b>	<b>0.05895</b>	<b>0.0589</b>
<b>Total = Criteria 1 + Criteria 2 + Criteria 3 + Criteria 4</b>	<b>1.00000</b>			<b>1.00000</b>	<b>0.26520</b>	<b>0.33270</b>

increase as the enhancement in independence achieved by the Bank of Japan (from 0.17 to 0.38). According to the computation in Table 1 and the calculations for Japan reported in Cargill, Hutchison, and Ito (2000), the Bank of Korea and the Bank of Japan now operate with similar levels of formal independence.<sup>14)</sup>

<sup>14)</sup> The CWN view that the old Bank of Korea was more independent than the old Bank of Japan is debatable. By any reasonable standard, the Bank of Japan was politically and operationally more independent than the Bank of Korea prior to 1997.

## **5.2. The New Bank of Korea and Price Stability Outcomes**

Bank of Korea policy outcomes will likely improve under the new Act despite the less than impressive increase in the independence index. In fact, combining the new Bank of Korea index of 0.33 and the estimated regression, generates a predicted inflation rate of 6.6 percent. The predicted inflation rate is considerably higher than the actual inflation rate experienced since 1998:1 suggesting that the independence index provides an overly pessimistic view of inflation policy outcomes in Korea.

## **5.3. Importance of an Inflation Target**

The inflation targeting framework is a major improvement in central bank institutional design that attempts to hold the central bank accountable in an explicit manner. The setting of the inflation target is a public event, thus further reducing the incentives for government to intervene in the formulation and execution of monetary policy. Most important, the inflation targeting framework prevents deflation as well as inflation. In the case of Korea, the inflation target has provided a framework for the Bank of Korea to achieve a lower inflation rate than achieved before independence while at the same time, constrains Bank of Korea policy to maintain a positive inflation rate. The positive inflation rate constraint is an important outcome of central bank redesign in Korea and the lack of such a constraint in Japan has become a major problem. The Bank of Japan permitted a decline in the price level without being held accountable since it is always capable of defining price stability in a broad manner and is not constrained by an inflation target. An inflation target would force the Bank of Japan to pursue a more expansionary policy.

## **5.4. Shift of Supervisory Responsibility and Inflation Policy Outcomes**

The transfer of bank supervisory power from the Bank of Korea to the Financial Supervisory Commission was an intensely debated issue. Irrespective of the arguments for or against the shift, it will not likely impact

inflation policy outcomes because the inflation target framework explicitly establishes an inflation target in a public manner. Failure to achieve the previous year's target will generate a dialog as to reasons for the failure and as the Bank of Korea now has a mandate to pursue price stability in an open and independent manner.

## **6. A FUNDAMENTAL FLAW IN THE REVISION**

The revision of the Bank of Korea Act, however, is fundamentally flawed in one important regard. Central banks have the ability to create and destroy high powered money in modern fiduciary financial systems and as such, play an important role in limiting systemic risk and contagion. While there are two sides to the debate over whether the central bank should have a formal role in financial regulation and supervision and different approaches are followed across countries, there is no debate that central banks play an important part of the safety net. The new Bank of Korea Act has removed prudential responsibility from the Bank's responsibilities. No doubt this was done to reflect the shift in supervisory responsibility to the Financial Supervisory Commission; however, the lack of an explicit responsibility for maintaining finance stability is troubling. The new Act makes it unclear to what degree the Bank of Korea can resist pressure to subsidize and/or bailout troubled institutions (Cargill, 1997/1998). While ultimately, policies of this nature would conflict with price stability, it would have been preferable for the new Bank of Korea Act to recognize the important role of the Bank of Korea in maintain financial stability. This could have been accomplished without any impact on the transfer of supervisory responsibility to the Financial Supervisory Commission. It is difficult to understand why responsibility for financial stability was removed.

Some argue that this observation is of little practice importance because the Bank of Korea remains a lender of last resort through the discount window, can request information on specific financial institutions, and request/require examinations by the Financial Supervisory Commission. Nonetheless, the omission of a specific responsibility for maintain financial

stability is unusual and harms the Bank of Korea in at least two ways. First, the omission may lower the esteem of the Bank of Korea among other central banks that have an explicit role in maintaining financial stability and second, the omission provides a vacuum for Ministry of Finance and Economy or other government pressure to support policies of forgiveness and forbearance in dealing with non-performing loans and troubled financial institutions.

Even if one accepts the argument the omission has little practical importance, the obvious question is then why not include prudential responsibilities as part of the formal policy objectives of the Bank of Korea.

## **7. CONCLUDING COMMENT**

The Bank of Korea's institutional design was significantly changed in 1998. The Bank of Korea is legally more independent than previously, but continues to rank at the lower one-third of central banks in industrial countries in terms of independence. This result is consistent with a recent IMF (2001) report on Korea's financial reform, which concluded the Bank of Korea remains dependent on the Ministry of Finance and Economy and little has changed as a result of the redesign effort. While Bank of Korea inflation outcomes could be improved upon, revision of the Bank of Korea Act was not focused on past policy errors of the Bank of Korea. The revision of the Bank of Korea Act and the motives for institutional redesign parallel the situation in Japan in the sense that revision was not a response to past central bank policy failures and the finance ministry found central bank institutional redesign a means to deflect attention from its own policy failures in dealing with financial distress. Despite these considerations however, the new Bank of Korea is likely to achieve a lower inflation outcome than in the past and more important, an inflation-target framework provides an operating environment that prevents deflation as well as inflation. While Korea is not likely to experience deflation, an inflation target is like an insurance policy to maintain expectations of price increases. In the 1980s, one would not have predicted declining prices in Japan nor the unwillingness of the Bank of Japan to raise inflationary expectations when such a policy was long overdue. In this respect, the revision of the Bank of Korea Act was more successful than revision



of the Bank of Japan Law.

At the same time, the revision of the Bank of Korea Act is fundamentally flawed. Failure to include a meaningful role in financial stability and limiting systemic risk in the new Bank of Korea Act is problematical and ultimately reduces the standing of the Bank of Korea from an international perspective and provides an opportunity to pressure the Bank of Korea into support a policy of forgiveness and forbearance in dealing with troubled institutions. The fact that the Bank of Korea conducts lender of last resort operations and has the ability to obtain information about the financial condition of specific banks is not a substitute for a formal role in limiting systemic risk. Along with price stability, prudential responsibility is a fundamental rationale for the evolution of central banking institutions in modern financial systems. The new Bank of Korea does not have the legal standing to take a strong position on financial stability issues since the new Act imposes only one responsibility of the Bank of Korea – price stability. Any dispute with the Ministry of Finance and Economy or the Financial Supervisory Commission is easily settled against the Bank of Korea since the new Act provides the Bank with no legal foundation to take any leadership role in dealing with troubled financial institutions and limiting systemic risk. While price stability provides an ultimate constraint on how far a central bank can go in bailing out troubled institutions, it would have been preferable for the new Bank of Korea to have a formal responsibility for financial stability shared with other parts of government, as is the case in the new Bank of Japan Law. The responsibility does not require the central bank to have formal supervisory responsibilities.

Thus, the new Bank of Korea is probably better equipped to maintain price stability, but less equipped to play a leadership role in maintaining financial stability.

## **APPENDIX 1**

### **The "Old" and "New" Bank of Korea: Key Differences**

### **Policy Objectives and Transparency of Monetary Policy**

"Old" Bank of Korea:

"The primary purpose of the Bank of Korea shall be: 1. to maintain the stability of the value of money in the interest of the national economic progress; and 2. to further economic progress and efficient utilization of national resources by the sound operation and functional improvement of the nation's banking and credit system." (A3)

"An Office of Bank Supervision shall, under instructions from the Monetary Board, be responsible for supervision and periodic examination of banking institutions with the purview of this Act." (A28)

"New" Bank of Korea:

"(1)The Bank of Korea shall set a price stability target every year in consultation with the Government and formulate and publish an operational plan for monetary and credit policies including this price stability target." (A6)

"(2) The Monetary Policy Committee must produce the minutes of each Committee meeting and publish them as determined by the Monetary Policy Committee." (A24)

"(1) The Bank of Korea shall at least once a year prepare a report on the implementation of its monetary and credit policies, and submit it to the National Assembly. (2) The Governor [of the Bank of Korea] shall attend, and answer the questions ...!" (A96)

"The Bank of Korea may, when the Monetary Policy Committee deems it necessary for the implementation of its monetary and credit policies, request banking institutions ..to provide any materials." (A87)

"(1) The Bank of Korea may ..require the Financial Supervisory Service set up under the Act Concerning the Establishment of Financial Supervisory Organizations ..to examine banking institutions." (A88)

"(1) The Monetary Policy Committee may ..request the Financial Supervisory Commission to reconsider a decision it has taken if it has a direct bearing on monetary and credit policies." (A89)

Implications:

The "old" Bank of Korea was responsible for price stability, ensuring financial stability, and as part of ensuring financial stability, was assigned a major role in bank supervision. There was no formal requirement for transparency in

carrying out either responsibility, other than the general requirement to prepare a balance sheet statement and annual report as specified in Section 6 of the old Act. The "new" Bank of Korea is legally responsible only for price stability in the context of an inflation target framework. The Office of Bank Supervision is eliminated. Monetary policy is now more transparent, in terms of both an explicit inflation target and frequent reporting requirements on monetary policy beyond standard balance sheet information and annual reports.

### Legal Independence

"Old" Bank of Korea

"The Monetary Board shall be composed of the following nine members: 1. the Minister of Finance and Economy, or the Vice Minister of Finance and Economy in the case the Minister of Finance and Economy is unable to serve ..."  
(A8)

"(1) The Minister of Finance and Economy shall preside at meetings of the Monetary Board." (A9)

"(1) The Governor [of the Bank of Korea] shall be appointed by the President on the recommendation of the Minister of Finance and Economy ..."  
(A23)

"(1)The Minister of Finance and Economy may request the Monetary Board to reconsider its resolutions adopted. (2) If the request ..is rejected by a majority of two-thirds of the Monetary Board's members, the final decision shall rest with the President. "  
(A39)

"The Bank of Korea shall be subject to a business examination by the Minister of Finance and Economy ..."  
(A40)

"(3) The Auditor [monitors operations of the Bank of Korea] shall be appointed by the Minister of Finance and Economy with the consent of the Monetary Board."  
(A23)

"New" Bank of Korea:

"The monetary and credit policies of the Bank of Korea shall be formulated neutrally and implemented autonomously and the independence of the Bank of Korea shall be respected."  
(A3)

"(1) The Monetary Policy Committee shall be composed of the following seven members: ..2. one member recommended by the Ministry of Finance and Economy ..(2) The Governor of the Bank of Korea ..shall become the Chairman of the Monetary Policy Committee ..."  
(A13)

"(2) The Auditor [monitors the operations of the Bank of Korea] shall be appointed by the President on the recommendation of the Minister of Finance. " (A43)

"The Vice Minister of Finance and Economy may be present and state his opinion at meetings of the Monetary Policy Committee." (A91)

"(1) The Minister of Finance and Economy may request the Monetary Policy Committee to reconsider a decision it has taken if he considers it in conflict with the Government's economic policy. (2) When the Monetary Policy Committee takes the same decision ..with at least five Members concurring, the final decision shall rest with the President. (3) When the Minister of Finance and Economy makes a request ..he must at once announce this publicly according to the provisions stipulated by the Presidential Decree." (A92)

#### Implications:

The "old" Bank of Korea was under the direct control of the Ministry of Finance and Economy, while the Ministry's influence under the "new" Bank of Korea has been significantly reduced. The Ministry can still play a role by appealing a decision; however, the requirement that the request is public effectively limits this power. The Bank of Korea however, is still responsible to the government in the broad sense. The President appoints the Governor and the other members of the Monetary Policy Committee and despite the commitment to "the independence of the Bank of Korea", Article 4 emphasizes the need for policy to be carried out in "harmony" with the Government's economic policy as long the Bank of Korea is not distracted from price stability. The explicit inflation target framework limits the ability of the government to influence policy, but does not eliminate the potential influence based on the need to harmonize monetary and government policy.

Source: Bank of Korea (1999)

## APPENDIX 2

### Inflation Bias and Discretionary Policy

Consider an intertemporal loss function, a discounted sum of the single period losses which are quadratic in inflation ( $p$ ) and deviations in real output from

the desired level  $(y - ky^*)$ :

$$L_t = \sum_0^T (1 + \mathbf{d})^{-i} [a\mathbf{p}^2 + (y - ky^*)^2]_{t+i}, \quad a > 0, \quad k > 1 \quad (1)$$

where  $y$  is real output,  $y^*$  is full employment output, and  $ky^*$  is the level of output desired. Desired output is above the full employment level, either because distortions in the economy make the "natural" full employment level too low or because the policy-maker has different preferences than the private sector.

A short-run Phillips curve describes the movement of output around the natural rate in response to inflation surprises:

$$y = y^* + b(\mathbf{p} - \mathbf{p}^e) \quad (2)$$

where  $\mathbf{p}^e$  is expected inflation.

The one period game ( $T = 0$ ) outcome, where the private sector commits itself to  $\mathbf{p}^e$  and then the policy-maker sets monetary policy to hit a particular inflation rate, generally gives an equilibrium with an inflation bias. This is because once  $\mathbf{p}^e$  is determined, it is possible for the government to "surprise" the market and extract additional output at the expense of additional inflation, as marginal benefits from output exceeds marginal costs of inflation in the minds of politicians (and voters) at that moment. The rational expectations equilibrium where expectations are correct (on average) gives, under discretionary policy, an inflation rate ( $\mathbf{p}_d$ ) and loss function ( $L_d$ ) equal to:

$$\mathbf{p} = \mathbf{p}_d = a^{-1}b(k-1)y^* \quad (3)$$

$$L_d = (k-1)^2 y^{*2} (1 + a^{-1}b^2). \quad (4)$$

This equilibrium is worse than if the government was able to credibly commit to a zero inflation policy, giving  $\mathbf{p}_p = \mathbf{p}_p^e = 0$ , and a loss function (with unchanged equilibrium output at  $y^*$ ) of:

$$L_p = (k-1)^2 y^{*2}. \quad (5)$$

The discretionary outcome is worse for the policy-maker, but without the ability to pre-commit credibly, the discretionary outcome is the equilibrium that will be obtained.

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