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An Overview of the New Pension System in Mexico
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1. Executive Summary

The pension system in Mexico is largely based on mandatory, defined contribution (fully funded), individual accounts which are privately administered by various specialized pension fund managers. It has existed since July 1997 after the Social Security Law was reformed. This scheme applies to the private sector workers who are affiliated to the Mexican Institute of Social Security (IMSS)¹. Government employees have a pension plan covered by the ISSSTE which is based on a pay-as-you-go (PAYG) system. Government agencies may set-up alternative pension plans and in the private sector a few companies (mainly multinationals) have developed incipient defined benefit programs, which are complementary to the mandatory private scheme.

For the mainstream program, the first pillar consists of a minimum pension guarantee (a lifetime annuity equal to the minimum salary in the country) that is earned under certain conditions if resources from savings in the second pillar are not sufficient to purchase the annuity. The second pillar consists mainly of the defined contribution venue with private administration in individualized accounts. Contributions are mandatory at 6.5% of salary and the government supplements this amount with a fixed amount. For minimum wage earners this is 5.5% of their salary decreasing for higher wages. Average contributions for the Mexican population are 8% of total salary. If workers do not use mandatory housing savings for such purpose that amount can be added to pension savings, which would make for an average contribution of 13%.

The reform can be considered a success due to the high affiliation rate, 74% of the potential market has already chosen a fund manager before it becomes mandatory in year 2001.² Resources under management represent close to 25% of the internal government debt and by the end of 1999 the total amount will be well over 10 billion dollars.

Fund collection and individualization is done efficiently for both pensions and housing monies, using the same infrastructure that the IMSS uses to collect health contributions. A centralized database helps to

¹ / Refer to appendix A for a key to commonly used abbreviations in the text.

² / In the mean time the resources remain in the "Concentrating Account" or Cuenta Concentradora. It remains a direct liability of the Federal Government, earning a guaranteed positive real rate of return.

maintain bookkeeping integrity and enables the regulator to carry out a close surveillance. The banking system has an important participation in the collection process, attending the employers.

The investment guidelines are very restrictive due to a misunderstanding of prudent behavior. However, they have not affected performance due to high local real interest rates. Prudential risk management regulation will foster coherent risk control and will allow changes in the guidelines.

2. Mexican Social Security

Social Security services in Mexico are considered to include not only pension related services (old age retirement, severance at old age and life insurance), but also health care (including maternity, childcare and disability), and housing. In an oversimplified description, these services were provided to private and government employees by the following institutions previous to the 1997 reform:

The Mexican Social Security Institute (IMSS) and the Housing for Workers National Fund Institute (INFONAVIT) provided health-pension and housing services respectively for private sector workers. The IMSS has existed since 1944 and the INFONAVIT was created in 1972 to provide housing to IMSS affiliates. At first, the housing institute was a full-fledged real estate developer and beneficiaries could only get loans to buy houses built by INFONAVIT. Since 1992 the institute has evolved into a financial institution that provides loans to buy houses (old or new).

The institutions that provide the analogous services for government employees are the ISSSTE and the FOVISSSTE. The former provides health and pension services and the latter facilitates housing related assistance.

Previous to the reform, the pension system was, either through the IMSS or the ISSSTE, a pay-as-you-go system (PAYG) which had all the demographic and incentive problems that these traditional schemes have.³ The funding for the first pillar came from workers, employers and the government and due to local hiring arrangements the second pillar was practically non-existent. Also the third pillar was really never developed because very little disposable income was available for voluntary savings.⁴

3. The Old Pension System

The main reasons for the first pillar reform were the actuarial imbalance of the pension system managed by the IMSS, that some studies had estimated at 80% of GDP, and the distortions in the design of the old-

³ / For a detailed explanation on the reasons for the Mexican reform please refer to "Pension System Reform: The Mexican Case"; Sales-Sarrapy, Solís-Soberón and Villagómez-Amezcuca in "Privatizing Social Security", edited by Martin Feldstein, NBER 1998.

⁴ / The World Bank has proposed an analytical model base on three "pillars" concept to describe different pension providing schemes.

system which resulted in a poor relation between contributions and benefits. This chapter draws heavily on the study by: Sales-Sarrapy, Solís-Soberón and Villagómez-Amezcuca.⁵

The financial deficit was brought by many factors which will be briefly explained.

Demographics. The Mexican population is quickly aging, population growth has gone from 3.7% in the 70's and 80's down to 1.9% at the beginning of the 90's. Life expectancy has gone from under 50 years in 1950 to 71 years in 1995. The ratio of contributing workers to pensions granted has dropped from 65 workers per pension in 1950 to only eight in 1995. These isolated figures give an idea of the demographic component of the problem.

Benefits. In the old-system pension rights were earned at age 65 with barely 500 weeks of contributions, this had an implicit return that could not be reasonably achieved in the local or international markets.⁶ The benefits not only covered the workers but also their relatives, making the pension system too generous in relation to the received contributions. As an example, on the average the IMSS paid a pension for 18 years after retirement for each insured worker and afterwards another pension to the corresponding widow for 12 more years. In many cases this benefit was obtained with slightly more than ten years of contributions that was the minimum vesting period; this has no relationship to a thirty-year payment. The implicit rate of return required on contributions to ensure the financial feasibility of such an operation is approximately 43% annually in real terms. The Mexican annual long-term real return rate has been 6.5% for peso denominated government securities and 13.3 % for the Mexican Bolsa.⁷ Therefore it was impossible to cover the benefits with the stated contributions.

Lack of Transparency. Due to the nature of the IMSS as the pension system administrator, it was able to decide how the resources from social security contributions were spent. At various points in time there were subsidies between different services provided by IMSS in which the pension fund resources were contributing to health expenditures.

⁵ / Sales-Sarrapy et al (1988).

⁶ / Retirement could occur at an earlier age with lower benefits.

⁷ / Source: CONSARs calculations with information from the Central Bank (BANXICO) and the Mexican Bolsa.

“Although there is a legal provision which establishes that every branch of insurance at IMSS should be self-financing, it has been a common practice to cross-subsidize programs with deficit. In particular, surpluses from the pension system have been used to cover expenses related to health and maternity insurance”.⁸

In certain cases, some expenses which were not necessarily related to health were covered. Over the years, the IMSS has been owner of soccer teams, theaters, recreation centers, etc., which stretches the definition of the social purpose of the institute.

Incentives. The pay-as-you-go structure had many deficiencies in terms of incentives, especially with poorly designed vesting rules. As was mentioned before, once the worker had contributed for 500 weeks he earned rights far more valuable than the paid resources. Furthermore, once this minimum requirement was fulfilled then the worker did not have any incentives to continue contributing.

On the other hand, if contributions were less than 500 weeks the worker had no rights on the paid contributions. This situation was especially unfair for many women that participated for a few years in the labor force before dedicating themselves primarily to child raising. It was more convenient for them to look for a job through informal employment, in which neither they or the employer would lose money through the payment of social security contributions.

Also, the pension base salary was calculated on the average of wages earned in the last five working years and not on the average of all contributing years. For workers with a high salary growth, especially in their final working years this meant they were retiring with an unfair replacement rate in comparison to their contributions. Workers in their final earning years had the incentive to retire before they normally would if their salaries were likely to decrease.

Cost of hiring. As can be seen in the table 1 social security contributions could represent over 30% of total payroll and increase the total cost of hiring. This creates the incentive in employers to underreport and since the benefits were imperfectly tied with contributions, employees did not always care about the situation.

⁸ / Sales-Sarrapy, et al (1998).

Informal work flourished in Mexico and coupled with a decrease in real salaries, contributed to the relative decrease in IMSS' resources.

All of the above demonstrated that there was an indisputable need to reform the pension system. Since the situation is of a slow but persistent deterioration the sooner it is done the better. Simultaneously other countries, mainly in Latin America, undertook the reforming task. Ironically, the countries with the worst demographic and funding problems have still not been able to attack the problem because the cost is impossible to absorb immediately. In the Mexican case, the government could afford to discuss the issue because the stakes were not as high as in other countries, it can be said that the country was still "on-time".

Nonetheless, it is always the case that a reform which involves any part of a country's Social Security, ends up immersed in political battles. The Mexican reform was not the exception and it took a lot of effort to pull through a law which despite all its shortcomings has been quite successful compared to similar experiences in other countries and also to the expectations previous to the reform.

3.1. Defined Benefit (DB) vs. Defined Contribution (DC) considerations

One of the first issues that emerges from a pension reform discussion is the defined benefit (DB) vs. defined contribution (DC) consideration. Abundant literature has been written in the topic and there are truly opposing views in this respect. At the time of the Mexican reform, recent history had witnessed "success" stories in Chile (1981) and Argentina (1994) in defined contribution schemes, in fact nowadays it is common for people to refer to the "Chilean Model". This model can be depicted in the following terms:

- Defined Contributions (old DB system phased out)
- Private Administration of Pension Funds
- Minimum Pension Guarantee (relative to average salary)
- Minimum Rate of Return Guarantee (relative to market average)
- Discretionary Limits in the Investment Guidelines (required maximum and/or minimum investments in certain asset classes)

The design of any pension reform should be forward looking in trying to resolve the problem in such a way that is financially sound in the long run. At the same time it is important to consider the institutional, social and political setting that exists and is expected to exist in the future. In an excellent proposal to reform the U.S. system⁹, Modigliani, et al, propose a New Fund (NF) that is a complete restructuring of the traditional PAYG system that keeps the defined benefit component through an implicit or explicit government guarantee. The central idea is that it is possible to have a defined benefit program that is fully funded by appropriate individual bookkeeping and a return guarantee. The proposal has many characteristics that may lead into a very efficient way of dealing with the pension problem, however analyzing some of the features individually it is evident that a U.S. like environment is needed to make it a working option.

It would be difficult to implement the NF idea in countries like Mexico. As an example let us take the proposal to mandate a passive indexation in order to decrease management fees and mitigate the risk that politicians manipulate the invested funds. As it will be explained, trying to import the idea into Mexico would be close to impossible.

In Mexico, the congress has restricted investments to local issuers thus increasing country risk by not allowing the best kind of diversification available for a Mexican citizen. With this restriction in place a fund manager is not going to be able to passively invest by indexing because there are no local bond indices and the only known local benchmark is the Bolsa Index and even this index is hard to use for liquidity considerations. Furthermore, stocks are still not allowed in the very primitive investment guidelines that are in place.¹⁰

In the Mexican reform (which substituted DB for DC) many people claimed that the government was renouncing its responsibility to support retirement for individuals. This argument is also used to criticize corporations that favor a DC alternative to their current plans. For the most part these ideas are supported by the fact that “institutions” are better prepared to meet return volatility or replenish insufficient reserves when needed. When this happens to a corporation, it can be considered a potential liability that stockholders could end up disbursing. This is not a risk that is closely related to the underlying business

⁹/ “An MIT solution to the Social Security Crisis”, Franco Modigliani, Maria Luisa Ceprini and Arun S. Muralidhar. Sloan Working Paper 4051, March 1999.

and therefore the firm may attempt to hedge it by a DC implementation. From a societal point of view, the worse thing that can happen is that by sponsoring a DB plan the corporation will decrease its earnings.

However, when the guarantor of the DB plan is the government it becomes a different problem. When shortfalls happen it is the taxpayers that end up paying the tab. Even assuming that an extremely efficient fund administration emerges from the government, financial feasibility is still at stake. Optimal fund management from this perspective would engage in a long-term zero-sum course of action. This means that funds will be supplied in economic downturns and recuperated in good times. It sounds easy and reasonable! Unfortunately most of the times it is not.

The three relevant variables that determine terminal pension wealth are: size of contributions, time contributing and return. All three have to be carefully balanced to achieve the desired result. For national mandatory pension plans the first two are decided by congress (at least in Mexico), whose economic prowess depends on the prevailing political moment.

The above considerations may result in high implicit return requirements that cannot be reasonably achieved. Moreover, it may happen that the mean-reversion assumption that is expected to predominate for the governments' counter-cyclical intervention to work, does not occur and those temporary pension deficits become permanent.

With this in mind, there is a strong argument in favor of stating that each country has to find a particular solution to the pension problem. Experience shows that even small differences in certain characteristics adopted within the "Chilean model" in the Latin American countries have brought what appear to be substantial different outcomes. Unfortunately, it is hard to tell whether these come from the small design differences or due to particular country settings. Too little time has elapsed since the adoption of reforms that would allow having a definite conclusion that would permit us to separate generic sound recommendations for pension reform from interesting results of an isolated experience.

¹⁰ / The Mexican government is currently working in a totally new approach to investment guidelines that may be enacted by the year 2000. It will follow the Prudent Man Rule venue with "buyside risk" concepts.

The Mexican solution relies basically on the idea that financial soundness and optimal surveillance is difficult to achieve through a defined benefit program. As was mentioned before, some authors have argued for the benefits of optimally structured defined-benefit programs. They claim that fund administration and bookkeeping is less expensive, to the extent that the bargaining power of a big fund (e.g. Provident Fund of Singapore) can lower trading, hedging and security analysis costs through “soft-dollars”. On the other hand, there is a way of keeping a centralized bookkeeping even in a DC context, as the ensuing description of the Mexican solution will illustrate.

3.2. The reform is attempted in 1992

The first attempt to reform the old pension provision structure was done through a fully funded vehicle that featured individualized retirement accounts in 1992 known as the “Retirement Savings System” (Sistema de Ahorro para el Retiro -SAR). It was complementary to the existing PAYG and both workers from the IMSS and ISSSTE participated. Funds were deposited in the Central Bank and earned a guaranteed return of 2.0% in real terms at inception, although the return level was increased to reflect levels closer to market conditions.

To fund the accounts an additional 2% was charged to employers’ pockets, but in the end, since the SAR was also mandatory it added all up to the total cost of hiring. It really didn’t matter in the private sector who was nominally paying it, the employers perceived it as a rise in employment expenses. On the other hand, it would be difficult to say that the workers saw this as an increase in their wealth, as an income they would receive in the future. A partial explanation for this is that there was practically no experience from people in retirement savings and the due to small contribution percentages to the SAR the initial amounts were very small. Moreover, economic and political uncertainty coupled with a small GDP per capita have forced Mexican workers to focus on the short term; saving for retirement is not an issue of prime importance for the average Mexican.

This first attempt to reform the pension system (SAR-92) can be considered a qualified failure. This happened in part because the country did not have a reliable national identification number (e.g. social security number). After a few years of existence this system had created a logistical nightmare. For an

estimated universe of 10 million workers contributing to the IMSS, the SAR managed to create more than 40 million accounts! The account multiplicity is still a problem nowadays and it highlights the critical importance of infallible accounting.

Table 1. Social Security Contributions in the Pension System (1992-1997)

	Total % of payroll	Source of Contribution		
		Employer	Employee	Government
IMSS				
IVCM	8.5%	70%	25%	5%
Health and Maternity	12.5%	70%	25%	5%
Workers Compensation	2.5%	100%	-	-
Child Care	1.0%	100%	-	-
SAR system				
INFONAVIT	5%	100%	-	-
Retirement	2%	100%	-	-
Total	31.50%	25.20%	5.25%	1.25%

IVCM – Invalidez, Vejez, Cesantía y Muerte (Disability, Old-Age, Dismissal and Life Insurance)
 Contributions applied to a base salary that had an upper limit of 10 times the minimum wage salary. Retirement, health and maternity are now limited to 25 minimum wage salaries. Base salary calculations for housing (INFONAVIT) are lower than for the others.

In addition, since no true verification was done in the SAR-92, there was the possibility of an employer to pay its Social Security contributions in full without ever stating who the beneficiaries were. There are extreme cases in which the firm no longer exists and therefore there is no way the individual can prove it has contributed money to its retirement. As a consequence there are resources which will never be correctly individualized.

When the recipient of social security services is part of a defined benefit environment or is receiving state provided health care these accounting failures end up being minor issues. However, in a defined contribution scheme the operational processes have to be practically fault-free to ensure fairness and credibility. The importance is derived from the fact that in defined contribution programs the individual ends up being its own sponsor.

Notwithstanding all of this, the SAR accumulated more than 5 billion dollars of pension money in the 1992-1997 period. The best part of this period are the lessons that were shown at the time which paired to the experiences from other DC reforming countries molded what is now the Mexican Pension System.

For the purpose of supervising the SAR-92 system the National Commission for the Savings for Retirement System (CONSAR) was created in 1994. This regulatory agency worked through the next step of the pension reform which was part of a comprehensive social security package.

4. The IMSS Reform in 1997

The “real” pension reform had to wait for a far-reaching Social Security reform which was discussed to great lengths between 1992 and 1995, until finally, major objectives were set. During 1995, Congress received a proposal submitted by the president which was approved in December of that same year.

The Social Security and Pension reform took place briefly after the worst financial turmoil Mexico has lived (1994-1995). Banks and bankers had the worst reputations with the general public and other financial intermediaries were not total absolved from this sentiment.

Not surprisingly the regulation philosophy was “draconian” in all respects and as such it is reflected in the “Ley de los Sistemas de Ahorro para el Retiro” or *System for Retirement Savings’ Law*. In all fairness it has served its purpose by breaking with old ways of conducting asset management business that were against the best interest of the individuals that had conferred its assets in care of third parties. Nonetheless regulation is quite imperfect and needs to be improved.

The reform redirected the funds that the IMSS had been using for the first pillar part of the system to a second pillar with individual accounts. Vested liabilities were recognized by an option offered by the government to the “transition workers”.¹¹ At retirement each individual will have his/her earned amount calculated as if they had stayed in the previous DB system, this would be compared to the amount of money they have saved in their individual account and individuals can choose the higher of both. This means that transition workers should not be worried about losing benefits due to the introduction of the new scheme.

¹¹ / A transition worker is anyone who held a job in the private sector previous to July 1st 1997 and was not retired at the time.

Individuals who have and will join the working force after July 1st 1997 will have to retire with a lifetime annuity that they have to purchase with resources that accumulate in their individual account.

The Mexican second pillar is complemented by a new first pillar, which consists of a government guarantee that individuals will retire with at least a lifetime annuity equal to the minimum wage (MW) indexed to the local Consumer Price Index. This pillar is used only if the -second pillar- individualized resources cannot provide the person with an annuity equal to a MW. The reform also provides individuals with the possibility of investing voluntarily on their own accounts.

Table 2. Contributions to Pensions in Mexico
(as % of payroll)

Contributions	Before the Reform	After the Reform	
	DOSL (IVCM)	RDO	LDA
IMSS contributions	8.5%	4.5%	4.0%
SAR retirement	2.0%	2.0%	
SAR housing	5.0%	5.0%	
Social contribution	0.0%	2.0% ²	
Total ¹		13.5%	4.0%
Contributors	15.50%	17.50%	
Employer	12.95%	12.95%	
Employee	2.125%	2.125%	
Government	0.425%	2.425%	

Source: IMSS and CONSAR

^{1/} Contributions were not recorded in an individual account due to the nature of the PAYG system.

^{2/} The government pays a fixed amount of 5.5% of a minimum wage (mw). The contributions was equivalent to 2.0% of the average wage of workers affiliated to the IMSS in 1997.

DOSL: Disability, old age, severance at old age, and life insurance.

RDO: Retirement, severance at old age, and old age.

LDA: Life and disability.

At the time the workers are affiliated to the system (workers have four years to choose a fund administrator until July 2001)¹² they select a pension fund manager of their choice and this information is fed to a centralized database (BDNSAR). Before the affiliation process is completed, the database manager (PROCESAR) does a verification process to check that the individual has not previously chosen another manager. Also, whenever a worker switches managers this change is registered. In Mexico individuals may change managers without cost at the time they earn a year of seniority with their current manager.

^{12/} After this date the remaining workers will be “assigned” to a manager by a process designed by CONSAR.

In relation to the investment of the assets, the fund managers have to comply with stringent investment guidelines.

This national DC plan is structured with a centralized database, which has all the relevant information on individuals that are affiliated to the system, and has its unique identifying system based on the Social Security Number¹³.

Pension money collection is done through the same process that Social Security Institute collects its contributions. The funds are dispersed after the information is verified and transferred to the fund managers that each individual has selected.

Being an important part of the Mexican pension design, the next sections describe in detail the collection and fund dispersion processes.

4.1. Collection Process

Emisión - Notificación {740,000 empresas notificadas Agosto 1999} – Recaudación – Verificación – Fiscalización 98% de éxito en el pago de la emisión (pagan correctamente) Subdeclaración y Evación

An interesting and extremely important feature of the Mexican Retirement System is that the collection of contributions is done hand-in-hand with the collection of all other social security monies. Collection is primarily employer-based with few workers contributing on an individual, voluntary basis to the IMSS. Every month the firms (regardless of size) receive a statement issued by the IMSS that makes an estimate -based on the previous collection period- of the amount that each employee is supposed to be contributing for health. Information on housing and pension is distributed every two months.

4.1.1. IMSS and contribution collection

In 1997 the IMSS made a significant advance in its collection process by the introduction of a software program that facilitates the collection process. This program goes by the cryptic name of Self-determination Sole System (Sistema Unico de Autodeterminación - SUA). Through it, the IMSS receives

¹³ / Since this number has proven to have some deficiencies, the government is currently engaged in a project whose sole objective is to provide a unique number to every Mexican (CURP). It will take some time before it is completely achieved.

the contributions of more than 93% of the workers (out of a total of 15 million) that make up close to 97% of the monetary value of the collection.¹⁴ This system has a version for Windows® and for DOS.

SUA allows to update information on the employer, employee and its different activities or “movements”. It has built-in tables for: fees for work risks, minimum wages, the Consumer Price Index and fines. The outputs of SUA are:

1. Employer and employee contributions to IMSS, INFONAVIT and the employee SAR account.
2. Amortization of housing loans to the INFONAVIT.
3. Extemporaneous payments and differences.
4. Affiliate activities such as: reinstatement, withdrawal from the firm, and salary change.

The SUA software has to be used if the employer hires more than five affiliates. Otherwise the employer pays the amount reflected on the statement generated by the IMSS or presents itself to one of the IMSS “sub-delegations” to make the necessary changes and get a “payments diskette”. The latter is also required when paying through the normal SUA but is generated by it.

The IMSS has a whole department in charge of making sure that all employers comply with their obligations. It can be said that in Mexico the most successful government agency in terms of making people contribute is the IMSS. Since the pension system is sharing this entire infrastructure to get its monies it can be said that the Mexican Retirement System is probably one of the best systems in terms of direct and indirect collection costs and efficiency.

It is also important to mention that the fund managers (AFORES) pay the IMSS for this service. The fee at this moment is \$16.9 pesos for each active worker in a year.¹⁵ Which means that the collection process costs the pension system about 20 million dollars per year.

¹⁴ / Source: “SUA 2000 para Windows”. IMSS e INFONAVIT. August 1999.

¹⁵ / Approximately 1.78 USD (9.5 pesos/USD).

4.1.2. Banks and contributions collection (Collecting Entity)

The IMSS has entered into an agreement with thirteen banks to expedite the collection process. When acting on behalf of the IMSS the banks are known as “collecting entities” (CE). This allows the IMSS to have over two thousand bank branches around the country involved in the collection process.

The CEs (banks-“collecting entities”) receive information and money from the employers. Validation is done as soon as the CE receives the information and if things don’t match certain preestablished criteria, the payment is refused and the employer is notified. The integrity of the information is extremely important and this process guarantees the quality of the information, avoiding the problems that occurred in the SAR-92 experience as was described before.

The information is given by the employer through the “payments diskette” or through the statements printed by the IMSS that were described before. The CEs charge the IMSS for participating in the collection process. Currently the fee is \$22 pesos per diskette or statement regardless of company size and the process is done on a monthly basis. Retirement and housing contributions are collected every two months. There are approximately one million employers in Mexico.

If the information is correct the CE sends the monetary resources to the Central Bank and the information to the centralized database (PROCESAR). At this time, additional verifications are done to the information.

4.2. Fund Dispersion Process and Individualization of accounts

4.2.1. Centralized National Database for the Retirement System (Base de Datos Nacional del SAR - BDNSAR)

An important element of the pension system is the centralized national database for all the information related to the pension fund system. This database known as National Database for the Retirement System (BDNSAR), contains information on each individual and the fund manager he/she is affiliated to. The primary function of this database is the identification of the individualized accounts with each manager, the control of the possible manager migration by the affiliates and the distribution of the periodic money flow to each account.

This component of the Mexican pension system effectively separates the employer from the decision that each individual worker makes in relation to the choice of asset manager. One important piece of information, which is not part of the SUA process, is the pension fund manager that the individual chose. This information is fed into the BDNSAR by the pension fund manager which “affiliates” the workers.

A diagram in appendix B illustrates the whole collection process.

4.2.2. Corporation in Charge of Managing and Information Processing of the BDNSAR (PROCESAR)

The database is property of the federal government and it is operated by a private entity called PROCESAR. This company is the only one authorized by the government to operate the database. One of the most important tasks of PROCESAR is to help in the unification of accounts, the purpose is that each individual affiliate will not have more than one account in the system.

Participa en procesos de afiliación, recaudación, traspasos, retiros, administración de cuentas de trabajadores que no han elegido AFORE

IMSS envía a PROCESAR sus actualizaciones al CANASE (Catálogo Nacional de Asegurados)

The funds are “dispersed” to the selected fund administrators who have to “individualize” the resources. At the moment this only implies they have to correctly assign a determined amount of shares in the only fund that they actually manage. The law allows different funds being offered to the public but at the moment only one has been approved and it has to be invested “fundamentally” (more than 51%) in securities which are indexed to inflation.

An important consequence of this process design is that the pension system is in practice non-dependant on the employers. The centralized database (BDNSAR) with PROCESAR and the CEs effectively allows workers to choose pension fund managers without the intervention of the employer. This is also an important part of the Mexican Retirement System design, the direct employer participation would bring along conflicts of interest and undesirable affiliating conducts between the fund managers and the employers or labor unions.

This operational structure fosters individual selection versus employer selection. This was important in the Mexican case because it makes it more difficult for those with a potential conflict of interest to influence the decision of the individual.

4.3. Supervision by CONSAR

The system has stressed from the beginning a tight supervision on the funds. The regulation agency receives information on a daily basis and compliance is sanctioned on a t+1 basis. This setting is typical for Latin reforming countries. One of the advantages of developments in the late twentieth century is that technology in terms of communications and computer processing capabilities are such, that with good planning it is quite inexpensive to have all the necessary information on a timely basis.

Accurate bookkeeping is central to the supervision task and the rules have gone as far as having CONSAR publishing the “official” accounts up to a third level. Moreover, CONSAR also publishes “accounting guides” that give a detailed explanation on how to fill out the accounts.¹⁶

The information is sent early in the morning and processed for regulatory purposes before noon. This is the basis of the daily supervision done with the accounting information on a mostly automatic way. Discrepancies originate an inquiry or if non-compliance is demonstrated a penalty.

On the other hand, there is also a part of the supervision that is done “in-situ”. Field inspectors have different supervision programs that are applied on a continuous basis. This is important since there are a number of qualitative aspects that have to be closely examined by inspectors who decide if there is something to be concerned about. This is a quite labor intensive task that requires experienced people who have acquired a complete working knowledge of the Mexican pension system.

¹⁶ / The CNBV had previously set the example, although CONSAR might have gone a bit further. Presently the CNBV was trying to more flexible and allow for a more dynamic bookkeeping. It often happens that whenever new operations surfaced, for which there were not any defined accounts, the managers had to wait until the CNBV had put the new accounts in auxiliary regulation to account for it “correctly”. Most of the time it was recorded incorrectly. Nonetheless, the CNBV is maintaining “regulatory reports” which homogenize the reported information, allowing managers to record events at their discretion while following accepted accounting principles.

5. Relevant statistics of the recently reformed system

At the beginning CONSAR authorized 17 pension fund managers that had relationship with banks and/or insurance companies. Close to 50% of the capital of the managing firms was Mexican.¹⁷ By the end of May 1999 there are only 13 managers left and further consolidation is expected.

By the end of August 1999, there are over 14.9 million workers already signed up in the pension system out of a potential universe of 20.1 million. Of these affiliates only 12.9 million are active contributors (the definition of active for this document is a worker who has had at least one contribution since the system started). The others have either retired, are unemployed, their employers are not paying contributions, etc. Almost half of the economically active population is part of the informal sector which doesn't contribute to this system.

Table 3. Registered Workers (total and with a contribution)

(end of August 1999)

Manager (AFORE)	Total Registered Workers (TRW)		Registered Workers with a Contribution (RWC) ¹		RWC / TRW
	Number of Workers	% of total	Number of workers	% of total	
Banamex-Aegon	1,742,930	11.7%	1,655,617	12.8%	95.0%
Bancomer	2,364,074	15.9%	2,123,680	16.4%	89.8%
Bancrecre-Dresdner	619,789	4.2%	534,265	4.1%	86.2%
Bital	1,499,758	10.1%	1,290,397	10.0%	86.0%
Garante	1,633,528	11.0%	1,413,039	10.9%	86.5%
Génesis-Metropolitan ²	140,957	0.9%	122,013	0.9%	86.6%
Inbursa	378,376	2.5%	376,135	2.9%	99.4%
Principal	332,999	2.2%	299,967	2.3%	90.1%
Profuturo GNP	1,998,211	13.4%	1,492,000	11.5%	74.7%
Santander Mexicano	2,026,656	13.6%	1,864,478	14.4%	92.0%
Sólida Banorte Generali	1,260,762	8.5%	1,040,799	8.0%	82.6%
Tepeyac	228,621	1.5%	179,494	1.4%	78.5%
XXI	462,473	3.1%	437,137	3.4%	94.5%
Zurich	185,576	1.2%	119,413	0.9%	64.3%
Total	14,874,710	100.0%	12,948,434	100.0%	87.0%

¹ Registered with at least one contribution to the individual account.

² By September 1999, Génesis-Metropolitan has been merged with Santander Mexicano.

¹⁷ / Appendix C shows shareholders percentage of holdings and also shows nationality of ownership.

The congress approved the reform proposal after it included a provision to impede concentration. There is a rule in the LSAR that establishes that the maximum percentage that any fund manager can have of the total potential market measured in number of affiliates is 17%. This can grow up to 21% with CONSAR's approval.

There are over 10 billion dollars under management in October 1999 after 27 months of operation. The average wage per individual in Mexico is close to \$4,300 annually.

Table 4. Participation of Fund Managers on the Potential Total Market

(end of August 1999)

Fund Manager (Afore)	Total Registered Workers	Share of Potential Total Market ¹
Banamex-Aegon	1,742,930	8.7%
Bancomer	2,364,074	11.7%
Bancrecer-Dresdner	619,789	3.1%
Bital	1,499,758	7.4%
Garante	1,633,528	8.1%
Génesis Metropolitan	140,957	0.7%
Inbursa	378,376	1.9%
Principal	332,999	1.7%
Profuturo GNP	1,998,211	9.9%
Santander- Mexicano	2,026,656	10.1%
Sólida Banorte-Generali	1,260,762	6.3%
Tepeyac	228,621	1.1%
XXI	462,473	2.3%
Zurich	185,576	0.9%
Total	14,874,710	73.8%

¹ Potential Total Market is defined by the IMSS. 30 - Dec - 1998 (20,149,340 individuals)

6. Investment Guidelines

Although the fund managers could offer more than one fund, until now only one has been authorized for each manager. By law, this fund has to be invested “fundamentally in securities which are Mexican inflation protected”. Specific guidelines for this fund are as follows:

At least 51% of the funds Total Asset Value (TAV)¹⁸ must be invested in inflation linked or inflation protected securities, this directive is supposed to give compliance with the law. Due to the lack of local securities with these characteristics the federal government had to issue securities complying with the guidelines. The latter are floating rate notes which pay the maximum of observed inflation in the period or the nominal coupon tied to the 3 month Mexican Treasury Certificate (CETE).

¹⁸ / Accounting standards for the pension funds allow very few liabilities. Therefore there is practically no difference between Net Asset Value (NAV) and Total Asset Value (TAV). The reason that it was decided to use TAV is that when using NAV a certain portion of the assets have to be cancelled out with the liabilities and therefore in repurchase agreements or not-same-day settlement operations it could be possible to have non-authorized securities.

At least 65% of the funds TAV must be invested in securities that either have a maturity shorter than 183 days or have floating rate notes whose rate is revised in less than 183 days. The reason for this is Mexico's high interest rate volatility and the mark-to-market valuation of the funds' securities. At the moment this is not really a "binding" rule for managers since anyway most of medium and long term debt instruments in Mexico are issued as floating rate notes.

There have been criticisms to this part of the investment guidelines because it is said that the pension wealth is not being invested in long-term securities as is supposed to be for pension funds. As was mentioned before, the guidelines follow a discretionary limit philosophy and therefore it was considered appropriate to control interest rate sensitivity to avoid a potential drop in the price of the funds. The rules have not been able to achieve this due to volatility and there have been many days since July 1997 that pension fund returns have been negative. Investment regulation has not affected returns at all due to the macroeconomic situation which has maintained real interest rates extremely high. However, if rules are kept in their current fashion it is estimated that yearly return losses may exceed 80 basis point with no real gain in terms of risk control.¹⁹

The managers can invest 100% of the funds TAV in securities issued by either the federal government or the "Banco de Mexico" (the central bank). This only applies to securities issued in Mexican pesos, for securities issued outside of Mexico -Brady Bonds and other sovereign debt instruments- a 10% limit of the TAV applies.

The managers can invest up to 35% of the funds TAV in corporate bonds and debt issued by private or development banks. The manager cannot invest more than 10% of the NAV in debt issued by private banks.

For securities other than those issued by the federal government and the Central Bank (Banco de México) the following restrictions apply to the funds:

- Up to 10% of the amount outstanding of any given issue can be bought
- Up to 10% of the funds TAV can be invested in debt issued by any single issuer

¹⁹ / CONSAR estimates based on a long-term return model.

- Up to 15% of the funds TAV can be invested in debt issued by related entities (for example when two companies are part of the same holding company)
- Up to 5% (or under special authorization 10%) of the NAV can be invested in securities issued by entities with which the fund manager has any kind of financial relationship (beneficial interest)

The funds can only invest in issues which have been awarded the two highest ratings by the rating companies authorized in Mexico (Standard & Poor's, Duff & Phelps and Fitch IBCA) in long-term securities. If securities are issued in maturities shorter than a year, then the top three ratings in the scale are allowed.

7. Fund Valuation

In the Mexican pension system the funds' resources flow continuously for various reasons. Worker's contributions, individuals changing managers after they earn a year of seniority, fund managers' money,²⁰ voluntary contributions, etc. are all money flows in and out of the pensions funds; hence, it is in everybody's best interest to have correctly valued fund prices everyday. For example, if an individual were to leave the fund after an important rise in the interest rates, and the fund price did not reflect this correctly, he/she would leave with more money than economically deserved. This would have a negative impact on the remaining individuals of the fund, the converse is also true.

Even more important, a financially sophisticated individual could theoretically try to "arbitrage" the funds if they didn't reflect current market conditions. The money saved on a voluntary basis can be withdrawn after being in the fund for six months and contributions have to be accepted anytime. And as has been mentioned individuals can switch managers periodically with no cost.

For this reason, the fund managers required to mark-to-market the funds' assets everyday. Valuation philosophy may seem awkward, it is certainly more common worldwide to have non mark-to-market valuations in pension funds. But in light of the particular Mexican economic circumstances and the specific pension system design the correct valuation procedures seem to be market oriented.

²⁰ / The fund managers are required to have a capital invested in the amount of 1% of NAV. This money has to be invested in the same fund in which worker's assets are managed. It was thought that this was a good way to align the investing incentives of the managers and the workers. Since money in excess of 1% can move freely, valuation has to be precise and CONSAR closely supervises these movements.

In reality the funds are marked-to-model instead of marked-to-market. True mark-to-market is not done because of the characteristics of the Mexican money and bond market, which is relatively liquid only in the shorter maturities for a limited type of debt assets.

The employed valuation models are neither proposed nor developed by each fund manager. The models and the input sources are determined in the “Comité de Valuación” (the Valuation Committee). This committee is attended by all the financial regulators²¹, the regulated institutions through their representative associations²², the “Bolsa Mexicana de Valores” (Mexican Stock Exchange) and some selected independent financial industry practitioners. The institution in charge of carrying out the daily pricing (called the “Price Vector”) is the Mexican Bolsa.

As it can be imagined, determining pricing models through a committee is a very inefficient and cumbersome process. In addition to this, the Bolsa is only responsible for applying the models but has no real responsibility over the quality of the actual prices. These two factors have led to a questionable condition of many of the securities prices, in particular in volatile days. Despite this, the “Vector” system has had the advantage of having a single price for all the securities.

However, the committee has decided that a possible solution would be the creation of entities whose only purpose will be the selling of securities’ prices. This institutions will be called “Vendedores de Precios” (“price vendors”), once authorized will have the responsibility of creating and implementing the price models. Fund managers (also each bank or insurance company) will buy their prices from the price vendor of its preference. With this, it is hoped that the quality of the prices will be higher. Unfortunately the unified pricing which was the sole virtue of the original pricing vector will be lost and supervision of the fund managers will be more complex.

8. Risk Analysis in the Pension System

The supervising agency conducts market and credit risk analysis on a weekly basis and is capable of conducting it daily. It also measures and publishes performance on the funds, before commissions, after commissions and risk adjusted returns. Different sensitivity measures are also calculated.

²¹ / CNBV (Banking and Securities National Commission), CNSyF (Insurance and Bond National Commission) and CONSAR.

²² / ABM (Mexican Bankers’ Association) AMIS (Mexican Insurance Institutions Association), the AMIB (Brokerage Houses Association), and the Pension Fund Managers’ Association (AMAFORE).

The funds are required to be “rated” on the basis quality of the assets, management and market risks; currently this rating is conducted by the local rating agencies.²³ This obligation is extremely important in a defined contribution arrangement since individuals are responsible of their investments and getting reliable information is very costly and time consuming, therefore CONSAR decided to require a public rate. It was also important to have a third party responsible of giving this “unbiased” opinion.

Self-regulation has also been attempted, specifically through the adoption of risk standards for these institutional investors. The seminal work by Capital Markets Risk Advisor has served as a guide. The results have not been satisfactory at the moment, but the strict timetable should force the industry to converge in a brief period of time.

8.1. Credit Ratings

According to the law (LSAR) non-government securities must be rated before they are eligible for investment by the pension funds, these ratings have to done by a locally authorized rating agency.²⁴ The fund managers can invest in securities that are rated in the first three rating levels for short term (less than a year) and in the first two rating levels for medium and long-term instruments. This requirement is above the local “investment grade” of BBB (i.e. A & AA and above). The allowed ratings are published by CONSAR in the investment guidelines.²⁵

A national minimum “investment grade” requirement (BBB) exists since 1991 for securities to be issued. A lack of institutional investors in the local market and the oligopoly of financial intermediaries has altered the ratings into a mere requirement without real market support. A proof of this is that it is impossible to distinguish a credit spread in the Mexican market. This is due to the fact that the underwriting agent could normally sell an issue in the primary market to investment vehicles geared to small investors at prices close to or higher than sovereign risk. These small investors are badly informed and have a hard time opposing this behavior. Furthermore, Mexican banks are currently paying around 5% in money market accounts whereas Mexican Treasury Bills pay close to 20%.

²³ / Since this kind of rating is not exclusively credit oriented it is really not necessary or even desirable that the credit rating agencies conduct it. However, it was decided to do it this way due to local institutional arrangements.

²⁴ / Until September 1999 the rating agencies that rate locally are Duff&Phelps, Fitch-IBCA and Standard&Poors. A fourth agency specialized in banks joined the market recently: Bankwatch.

²⁵ / Investment Guidelines are written in the “Circular 15-1 & 15-2”.

The minimum-rating requirement for pension funds (A & AA), which was thought to be a prudent measure due to local instability, has brought unwanted situations. Issuers engage in a “rating shopping” pressed by the fact that pension funds are major clients for local issues, particularly the sizeable ones. This has driven rating agencies into a tight spot, because aside from the IPO requirement, the only entities requiring the rates are government regulating agencies like CONSAR. The rate is still only a requirement not something that could influence pricing in any significant way. Only now the rating is higher than the previous “investment grade” limit.

The situation just described is slowly changing, however some years may have to elapse before Mexico has macroeconomic conditions and institutional settings such that local ratings have the importance that they have in other more developed markets.

8.2. Credit Risk Analysis

Within this limited framework the supervising agency (CONSAR) performs credit analysis of the pension funds. Taking advantage of the ratings requirements it was decided that these would be used instead of attempting to do individual credit risk analysis of debt securities issued by different companies.

The first step was the construction of an historical database of all the instruments that have been rated in Mexico, the information was not available in any reliable form. This database includes all the ratings that Mexican locally issued securities have had, including every ratification or change in their credit rating. The information is directly supplied by the rating agencies on a monthly basis.²⁶ As was mentioned before, in Mexico credit ratings started to be a regulatory obligation for debt securities issued since 1991, so the historical information of ratings begins in that year.

Once the credit database was complete with the help of the rating agencies, the next step in the credit risk analysis was to estimate the probability that a security could change its rating in a period of time. These probabilities are estimated using a probability transition matrix for the rating migrations. To compute a one-period transition probabilities for every rating category, each security’s rating at the end of a particular

²⁶ / Ratings change in a continuous basis and at the moment they are supplied on a monthly basis but the agencies could be supplying the information as the ratings change.

period is compared with its rating at the beginning of the same period. Intermediate rating changes within the same period are discarded.

Each one-period matrix displays all rating movements between rating levels from the beginning of the period through the end of the same period. These one-period matrices were averaged into a final transition matrix that includes all the historical information of the ratings' changes and confirmations. This average matrix is a summary of the historic information, whose probabilities represent the likelihood that the ratings listed on their first column (see table below) will change to the ones listed on their top row in the course of a period. The matrix diagonal indicates the probability that an instrument will have the same rating at the beginning and at the end of the period. The period that is used is one year.

In Mexico there are three authorized rating agencies, each one has a different rating scale, to make them comparable it was necessary to build a homogenizing table. The matrices were computed using this scale that consists of numbers from one to six, where one is the best rating level (representing a AAA) and where six represents default. A Mexican transition matrix for medium-term securities with historical information from 1991 to May 1999 is presented in the next table.

Rating Transition Matrix (1991 – 1999)
(Medium-term securities, 3 – 5 years)

	1	2	3	4	5	6
1	91.46%	1.22%	4.88%	2.44%	0.00%	0.00%
2	0.54%	87.43%	8.64%	0.68%	2.03%	0.68%
3	0.10%	3.77%	77.50%	13.74%	3.30%	1.60%
4	0.00%	0.00%	2.11%	76.80%	15.48%	5.61%
5	0.00%	0.00%	0.00%	2.54%	71.82%	25.64%
6	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%

These matrices are recalculated on a monthly basis including the information that the rating agencies provide concerning the ratings movements and confirmations that took place in the previous month. The information is classified into different terms to maturity (short, medium and long) and three transition matrices are produced.

For each one of the rated securities in which the Mexican pension funds invest, the probability of default is estimated using the rating transition matrices. The probability that a debt instrument may have a change in its rating such that it would no longer be permitted by the investment guidelines is estimated as well. The

latter can be estimated by adding the probability that an instrument changes its rating to level three, plus the probability of a change to level four, plus the one for level five. For example, a security rated in level 2 has a probability of 0.68% of going on default, and a probability of 11.35% of having its rating changed to a level that is no longer allowed by the investment guidelines.

Since the reform started there have been no defaults or downgrades that would bring a security to non-complying ratings.

The statistical confidence level that these numbers have is doubtful because there's not enough history in the local market coupled with the ratings industry previously described. Credit risk analysis is quickly evolving and CONSAR's work can be catalogued as elementary. However, by attempting to quantify the credit risk, the pension system has given a big step forward in the direction of utilizing risk analysis tools.

8.3. Operational Risk in the Mexican Pension System

Operational Risk has recently become an important issue in world financial markets. Thus the quantification and mitigation of it is an important feature of sound risk management practice. Operational risk can be defined as the risk resulting of losses caused by events that happen within the organization or external ones that may affect the normal operation of it. These events can be errors, omissions, frauds, breaches of confidentiality, system failures and catastrophes. Operational risk is generally associated with inadequate processes and controls, human and system failures in day to day operations.

To help the participants of the Mexican pension funds system to identify this risk, CONSAR conducted in 1998 an investigation on the processes related to the investment function in the AFORES and the internal controls that had been adopted. The investigation was divided in three aggregated processes:

- Investment decision (Investment Committee)
- Buy-sell operation (Senior Investment Officer and Traders)
- Settlement and payment (Backoffice)

The research helped to identify many of the internal controls that were in place, if any, in the different AFORES. Observed internal controls included: bookkeeping, confirmations, auditing of compliance,

opportunity of market and transactions information, communication barriers, segregation of duties, money and securities transfer systems and authorizations.

CONSAR was able to get together and interview most of the people related to the investment process including the CEO. In some cases, the interviewers had the opportunity to sit at the trading desks and follow the process first-hand. The processes survey gathered information on the operational risk losses and the precise specific that generated them. All of the above helped to have a complete vision of what was needed to mitigate operational risks.

After recognizing the futility of regulating away this risk by mandating ways of undertaking particular tasks, CONSAR published a document that reflects “Best Practices” recommendations for investment operation processes. The first version of the document was issued in early 1999.

A working group with the participation of the pension fund industry was organized to discuss this document. Modifications to the document are still taking place and since many of the risks emerge from the interaction with other financial system participants. Many have been invited to make comments to the Best Practices document (Mexico’s Central Bank, the centralized depository institution, banks, custodians, the Bank and Securities Commission, etc). Simultaneously these entities have been asked to contribute to this objective in whatever influence they may have in the pension funds.

Based on the results of this investigation and on various documents published by BIS (Bank of International Settlements), the Basle Committee for Banking Supervision, the Risk Standard Working Group, a second document with recommendation for operational risk mitigation was released in October of 1998. This document describes the various forms the fund managers (AFORES) use to execute these processes and makes recommendations to improve settlement, controls, accountability, communication, and catastrophe recovery.

The final document still needs participants work, but at the end it will serve as guideline for future control implementation and for development of techniques for identifying and supervising Operational Risk.

9. Fund Performance

Performance measurement is a very controversial topic, the law (LSAR) states that CONSAR is the only entity authorized to officially report information related to pension fund performance. Officially released information consists of nominal and real performance before and after commissions, and is published in periodical press releases, in the bi-monthly information bulletin, and in CONSAR's own web page.²⁷ The fund managers may use the provided information as they deem adequate subject to the marketing regulation.

Nevertheless, CONSAR also produces "internal" reports that in addition to the previous statistics disclose performance on a risk-adjusted basis and for periods different to the ones reported "officially". These reports are elaborated on a weekly and end-of-month basis. It may be said that in calculating all performance measures AIMR standards are followed but absolute compliance cannot be claimed as will be explained later.

These "internal" reports are provided to the fund managers and the rating agencies twice a month. This serves the purpose of introducing those managers who don't have internal performance analysis to the basic concepts and the trade language. For those with proprietary analysis it serves the purpose of benchmarking their own internal calculations and have comparisons of all the funds with a homogeneous methodology.

It is hoped that providing comparative information on all the pension funds allows the individuals to evaluate the performance and the expected profitability due to the different fees charged by the fund managers. This paternalistic attitude of the regulation agency is considered necessary because:

- performance-reporting task is quite difficult due to the various ways in which commissions can be charged
- only CONSAR has the information needed on a timely basis to undertake the performance reporting task
- it accomplished true comparability because the same methodology is used to report all performance numbers

²⁷ / The web page is: www.consar.gob.mx .

It should be said that performance measures disclosed to the media were discussed with the pension fund industry prior to their release and adaptations were made based on their opinions. There are four performance measures that are used for the published and internal reports:

9.1. Return Before Fees (managers performance ex-commissions)

Each pension fund (SIEFORE) has a daily market price at which money inflows are converted to fund shares or withdrawals are paid. Unfortunately returns calculated using only the funds' stock price, are not comparable from any point of view due to the diversity in the commission structure. Front-load commission information is not reflected on the fund price as the money is held before the money gets to the fund.

Table 5. Commissions for Fund Management

(end of August 1999)

Fund Manager (AFORE)	Flow Based ¹ (% on SBC) ²	NAV Based (% on NAV) ³	Performance Based (% over benchmark) ⁴
Banamex Aegon	1.70		
Bancomer	1.68		
Bancrecer Dresdner	1.60	0.50	
Bital	1.68		
Garante	1.63	0.50	
Génesis Metropolitan	1.65		
Inbursa			33.00
Principal	1.35	0.75	
Profuturo GNP	1.67	0.70	
Santander Mexicano	1.70	1.00	
Sólida Banorte Generali	1.45	1.00	
Tepeyac	1.60	0.15	
XXI	1.50	0.20	
Zurich	1.45	0.50	

^{1/} Front Load Commission based on SBC

^{2/} SBC: Base Salary Calculation (Salario Base de Cálculo)

^{3/} Annual commission charged on a daily basis

^{4/} Performance over Mexican Consumer Price Index

There are various ways to overcome the comparability problem depending on the information that is needed. The first one is calculating a return that eliminates commission distortions such that prices reflect

performance had fees not been charged at all. The SIEFOREs charging fees based on NAV or performance over a benchmark affect the fund's price as opposed to those that charge a front-load only. To compensate for this, the NAV or performance commissions charged on a daily basis by fund managers is added back to the fund's assets and commission adjusted price are obtained.

This statistics is used to analyze the manager's investment strategy regardless of fee structure. It is on this data that performance attribution can be calculated to evaluate strategic and tactical asset allocation decision. A sample of all the performance reports is in Appendix D.

9.2. Return After Fees (return for the affiliate after commissions)

To evaluate the actual returns gained by the fund's affiliates, a return net of commissions for the period is calculated. However, true individual statistics can only be observed on the values calculated individually not on this aggregated way. There are many reasons for this: contributions are not homogeneous during the analysis period, some may not have contributed at all during the period, neither the "social contribution"²⁸ nor voluntary pay front-load commissions, etc. The asymmetry made it necessary to assume the presence of a "representative worker" and make the calculations as a representation of the outcome for the fund.²⁹ The data is used to generate annual flows and proceed to estimate an internal rate of return that is a fair assessment of the return that the worker can expect at the end his/her working life.

The assumptions normally used are:

1. Earning of 3.0 minimum wages.
2. Growth in salary of 1.5% annually.
3. 25 years until retirement.
4. No initial balance (which means that nothing was accumulated in the SAR-92 reform).
5. Commission structure will remain stable (e.g. seniority discounts).
6. No voluntary contributions.
7. Real returns since observed from July 1997 to measurement date remain constant in the future.

²⁸ / The "social contribution" is an amount paid by the government on the basis of days worked. This was decided to enhance replacement rates for low-income earners. It is a fixed amount of 5.5% of one minimum wage and indexed to the CPI.

²⁹ / To appropriately reflect performance for each individual the statement of account reflects an internal rate of return based on all the particular flows (positive or negative) that he/she had over a period of time. This statement has to be sent at least once a year.

The last assumption should be eliminated and this would make a fair comparison of different commission structures. It might have been kept in order to illustrate that return does matter independently of commission structure.

9.3. Equivalent Commissions

As has been mentioned, the fund managers charge fees based on: flow (front load based), NAV (asset based) and performance. To simplify commission comparisons it is necessary to compute a standardized measure of fees. There are two kind of equivalent commissions: flow equivalent fees and NAV equivalent fees. The equivalent fees show the fee that should be charged by each fund in order to get the same return as the after fees return, assuming that the other kind of commissions does not exist. The same assumptions made to compute the after fees returns are applied.

9.4. Risk-Adjusted Return Measures

In accordance with best practices to evaluate returns efficiency given the risk taken by the asset managers, risk-adjusted performance is measured. They are calculated using benchmarks computed by CONSAR, this is done because there are few good quality benchmarks (when available) in Mexico. The risk adjusted measures computed are: the Sharpe Ratio, the Information Ratio and the M-squared measure.

10. The Three Pillars and other pension schemes

The 1997 pension reform was aimed specifically at workers of the private sector. Government employees currently participate in a DB government administered plan. Simultaneously there is the old voluntary venue for firms that provide the “standard” DB plans for their workers. Statistics on both of these are non-existent or highly unreliable because disclosure has not been enforced or even strongly suggested either by the government or the local accountants’ professional organization.

11. Integration of “reforming countries”

In October of 1997 in Argentina the AIOS (International Association of Pension Funds Supervisory Organs) was formed with the objective of discussing experiences in the transition of pay-as-you-go to individual capitalization (DC) pension systems. After this first meeting, there have been other five

meetings in Mexico, Peru, Uruguay, Costa Rica and El Salvador, the next one will take place in Mexico next November.

The AIOS doesn't have fixed offices or personnel. It works through Technical Commissions where the member countries are represented. There are four of these technical commissions and they deal with the following topics: Investments, Supervision, Benefits and Statistics. The objective of these commissions is to give general recommendations and guidelines for the members on the issues discussed. The issues that have been discussed in the Investment commission are: investment guidelines, asset pricing and risk management and in the Benefits commission the topic of international portability has been explored.

In the next meeting in Mexico the following issues will be discussed within the investment commission: the creation of a self-regulatory best practices guide by the fund managers and the use of risk statistics to determine investment guidelines versus the use of traditional investment guidelines. Within the statistics commission the issues will be: the use of a unified methodology to calculate the funds fees and the publishing of a bulletin with comparable statistics for all the member countries.

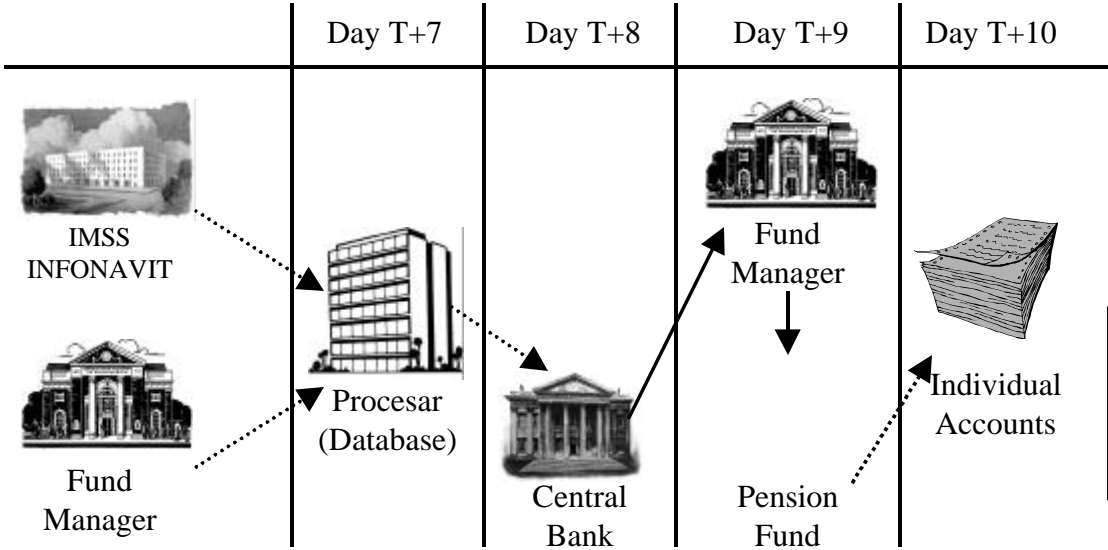
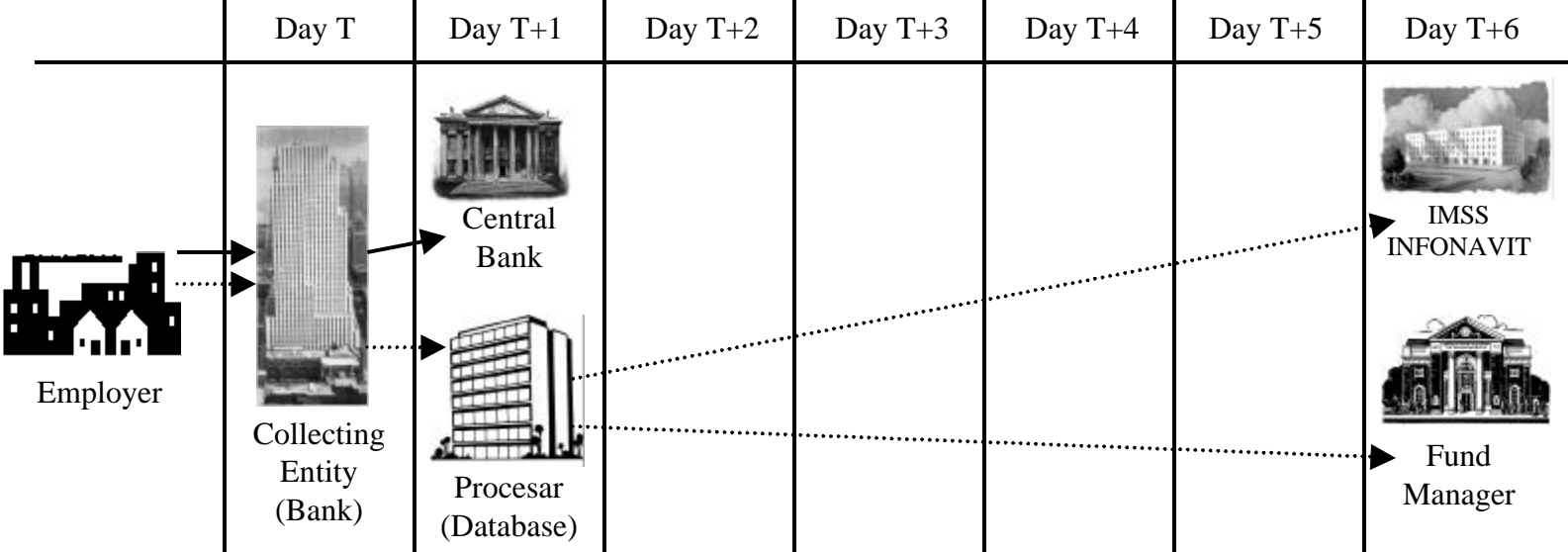
This association now comprised exclusively by Latin-American countries is open to countries from any continent. The current members are: Argentina, Bolivia, Chile, Colombia, Costa Rica, Mexico, Peru, El Salvador and Uruguay. New members include Guatemala, Nicaragua and Venezuela. Hungary and Poland have also been invited to become members.

Appendix A

Abbreviations used in the Mexican Pension System

AFORE	Administradora de Fondos de Ahorro para el Retiro	Administrator of Funds for Retirement. Pension Fund Manager.
BANXICO	Banco de México	Bank of Mexico (The Central Bank)
BDNSAR	Base de Datos Nacional del SAR	National Database of the Savings for Retirement System. Centralized Database that allows the operation of the pension system.
CETE(S)	Certificado de la Tesorería de la Federación	Federation Treasury Certificate. The Mexican Treasury Bills are currently issued in 28, 91, 181 and 364 day maturities. Weekly auctions are normally held on Tuesdays and settlement occurs on Thursdays.
CNBV	Comisión Nacional Bancaria y de Valores	National Banking and Securities Commission
CNSF	Comisión Nacional de Seguros y Fianzas	National Commission of Insurance and
CONDUSEF	Comisión Nacional para la Protección y Defensa de los Usuarios de Servicios Financieros	National Commission for the Protection and Defense of the Users of Financial Services. It is the financial services industry ombudsman and was given legal existence in 1999.
CONSAR	Comisión Nacional del Sistema de Ahorro para el Retiro	National Commission of the System for Retirement Savings. Mexican Pension Fund Regulation Agency
FOVISSSTE	Fondo de la Vivienda del Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado	Fund for Housing of the ISSSTE
IMSS	Instituto Mexicano del Seguro Social	Mexican Social Security Institute
INFONAVIT	Instituto del Fondo Nacional de la Vivienda para los Trabajadores	Institute of the National Fund of Housing for the Workers. Provides health services for formal private sector workers.
ISSSTE	Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado	Institute of Security and Social Services for the State Workers. Provides health and pension services for most government workers
LSAR	Ley de los Sistemas de Ahorro para el Retiro	Systems for Retirement Savings' Law. Law that governs the newly reformed system (August 1996)
PROCESAR	Empresa Operadora de la BDNSAR	Database Manager of the National Database of the Savings for Retirement System.
SAR	Sistemas de Ahorro para el Retiro	Systems for Retirement Savings. Name given to the defined contribution pension reform taken place first in 1992 and in 1997.
SBC	Salario Base de Cálculo	Base Salary for Calculations. The salary definition used for Social Security and Pension Fund contributions. Flow based commissions are charged on SBC.
SIEFORE	Sociedad de Inversión Especializada en Fondos de Ahorro para el Retiro	Investment Fund Specialized in Retirement Savings. Pension Fund.

Collection Process



Appendix C

Ownership of Fund Management Companies (AFORES) by Nationality

(December 1998)

Pension Fund Manager	Shareholders	Percentage	Nationality
1 Banamex - Aegon	* Banco Nacional de México, S.A. (BANAMEX)	51.0%	
	* Aegon Mexico Holding B.V.	49.0%	Mexico Netherlands (controlled by Aegon International N.V., Netherlands)
2 Bancomer	* Bancomer S.A., Institución de Banca Múltiple, Grupo Financiero Bancomer	51.0%	Mexico
	* Santamaría Internacional, S.A.	16.0%	Chile (controlled by AFP Santa Maria S.A., Chile)
	* Aetna International Cía. S. en N.C. de C.V.	33.0%	Mexico (controlled by Aetna International Inc. and AE Five Inc., all based in the U.S.)
3 Bancrecer - Dresdner	* Bancrecer S.A., Institución de Banca Múltiple Grupo Financiero Bancrecer	51.0%	Mexico
	* Dresdner Pension Fund Holdings, LLC.	44.0%	U.S. (controlled by Dresdner Bank A.G., Germany)
	* Allianz México, S.A.	5.0%	Mexico (controlled by Allianz of America, Inc., U.S.)
4 Sólida Banorte - Generali	* Banco Mercantil del Norte S.A., Institución de Banca Múltiple, Grupo Financiero Banorte	51.0%	Mexico
	* Participatie Maatschappij Graafscghap Holland, N.V.	24.5%	
	* Bélgica Insurance Holding, S.A.	24.5%	Netherlands (controlled by Assicurazioni Generali, S.p.A., Italy) Belgium (controlled by Assicurazioni Generali, S.p.A., Italy)
5 Bital	* Banco Internacional S.A., Institución de Banca Múltiple, Grupo Financiero Bital	00.01%	Mexico
	* Seguros Bital, S.A.	99.99%	Mexico (with foreign investment of 49% by ING Insurance International, B.V.)
6 Principal	* Principal International Inc.	99.99%	U.S.
	* Principal Holding Co.	00.01%	U.S.
7 Garante	* Banca Serfín, S.A. Institución de Banca Múltiple, Grupo Financiero Serfín	51.0%	Mexico Mexico (with a majority of foreign ownership, controlled by Grupo Financiero Citibank Mexico, Mexico)
	* Citibank México, S.A. Grupo Financiero Citibank	40.0%	
	* Habitat Desarrollo Internacional, S.A.	9.0%	Chile (controlled by AFP Habitat S.A., Chile)
8 Inbursa	* Banco Inbursa S.A. Institución de Banca Múltiple, Grupo Financiero Inbursa	94.3%	Mexico
	* General Electric Assurance Company	5.7%	U.S.

9 Profuturo - GNP	* Grupo Nacional Provincial Pensiones S.A. de C.V.	51.0%	Mexico
	* Banco Bilbao Vizcaya - México S.A.	25.0%	Mexico (with a majority of foreign ownership, controlled by Grupo Financiero BBV-Probursa, Mexico)
	* Provida Internacional S.A.	24.0%	Chile (controlled by AFP Provida S.A., Chile)
10 Santander Mexicano	* Banco Santander Mexicano S.A. Institución de Banca Múltiple, Grupo Financiero Invermexico	75.0%	Mexico (with a majority of foreign ownership, controlled by Santander Investment International Bank, Puerto Rico)
	* Santander Investment S.A.	25.0%	Spain
11 Tepeyac	* Tema Vida, S.A. de C.V.	67.0%	Mexico (with foreign participation of Mapfre America, Spain)
	* Caja de Madrid Vida, S.A. de Seguros y Reaseguros	33.0%	Spain
12 XXI	* Instituto Mexicano del Seguro Social (IMSS)	50.0%	Mexico (Government agency)
	* IXE Banco S.A., Grupo Financiero IXE	50.0%	Mexico
13 Zurich	* Zurmex Canada Holdings, Ltd.	85.42%	Canada
	* Holdings by Individuals	13.89%	Mexico
	* Grupo de Inversionistas México, S.A. de C.V.	00.68%	Mexico

Returns from Stock Prices

Information from the Mexican Bolsa

SIEFORE	Last 3 months		Last 6 months		Last year		Last two years	
Profuturo GNP	20.72	7	22.35	1	32.96	1	29.27	1
Banamex - Aegon	20.72	6	21.99	3	32.85	2	28.93	4
Garante	20.21	9	21.47	8	32.79	3	28.89	5
Bital	20.82	5	21.86	4	32.62	4	28.98	3
Bancomer	20.84	4	21.71	5	32.60	5	29.25	2
XXI	21.17	1	21.51	7	32.47	6	27.21	8
Bancrecer	21.03	2	22.15	2	32.27	7	26.15	12
Santander Mexicano	19.86	12	20.79	12	31.50	8	26.85	11
Zurich	20.19	10	21.56	6	31.33	9	27.13	9
Principal	20.32	8	21.31	10	31.26	10	27.97	7
Banorte	20.93	3	21.47	9	31.06	11	28.38	6
Tepeyac	20.05	11	20.97	11	30.03	12	26.97	10
Inbursa	15.98	13	16.71	13	26.39	13	24.70	13
SYSTEM	20.69		21.69		32.32		28.42	
ISIRF-PF	15.76		18.03		23.97		23.29	
ISIRF-PM	17.40		20.43		26.53		26.14	
ISIRV	-36.35		3.11		22.34		-3.03	

SYSTEM: Weighted average using daily value of funds' assets as weights.

ISIRF-PF: Index of Debt Instruments Mutual Funds for Companies

ISIRF-PM: Index of Debt Instruments Mutual Funds for Individuals

ISIRV: Index of Common Stock Mutual Funds

Returns Before Fees

With accounting Information

SIEFORE	Last 3 months		Last 6 months		Last year		Last two years	
Profuturo GNP	21.37	3	22.96	1	33.64	1	30.08	2
Principal	21.09	5	22.12	5	32.98	2	29.81	3
Garante	20.55	11	21.65	11	32.89	3	28.96	6
Banamex - Aegon	20.72	10	21.99	6	32.85	4	28.93	7
Banorte	22.09	1	22.85	2	32.79	5	30.56	1
Santander Mexicano	20.89	6	21.87	7	32.79	6	28.36	11
Zurich	20.86	7	22.59	3	32.74	7	28.88	9
XXI	21.37	2	21.73	9	32.71	8	27.98	13
Bital	20.82	9	21.86	8	32.62	9	28.98	5
Bancomer	20.83	8	21.71	10	32.60	10	29.25	4
Bancrecer	21.36	4	22.33	4	32.38	11	28.53	10
Inbursa	20.02	13	20.73	13	31.59	12	28.88	8
Tepeyac	20.20	12	21.38	12	30.88	13	28.21	12
SYSTEM	20.89		21.90		32.68		29.04	
CROMO	17.36		19.67		28.11		26.55	
ICETI7	8.56		15.10		28.53		22.75	
PRLV-28	11.49		11.93		17.32		17.78	

CROMO, ICETI7 and PRLV-28: benchmarks calculated by CONSAR

Returns Before Fees

Nominal and Real Returns in Pesos and Nominal USD Returns

Start Date 01/07/1997
Final Date 09/30/1999

SIEFORE	Nominal		Real*		Nominal		USD**	
		MXP		MXP				
Profuturo GNP	31.03		10.34		19.67		1	
Banorte	30.80		10.17		19.47		2	
Bital	30.08		9.65		18.86		3	
Principal	29.94		9.55		18.75		4	
Garante	29.65		9.34		18.49		5	
Bancomer	29.58		9.29		18.44		6	
Banamex - Aegon	29.28		9.08		18.19		7	
Inbursa	29.12		8.96		18.04		8	
Zurich	28.97		8.85		17.92		9	
XXI	28.69		8.65		17.68		10	
Bancrecer	28.68		8.64		17.68		11	
Santander Mexicano	28.39		8.43		17.43		12	
Tepeyac	28.16		8.26		17.23		13	
SYSTEM	29.41		9.17		18.30			
CROMO	27.53		7.81		16.70			
ICETI7	22.79		4.38		12.68			
PRLV-28	18.08		0.97		8.68			

* Discount Rate: UDI (inflation unit of account calculated using the Mexican Consumer Price Index)

** Exchange Rate: FIX Exchange Rate from the Mexican Central Bank

↑ Tables sorted by this column

Risk Adjusted Returns

Using Returns Before Fees

First Date 06-Jul-99
Last Date 30-Sep-99

SIEFORE	M ² *	Sharpe *	IR
Banorte	26.47	2.98	0.188
XXI	24.94	2.76	0.174
Profuturo GNP	24.60	2.75	0.173
Bancrecer	24.43	2.70	0.170
Principal	24.12	2.69	0.170
Zurich	24.02	2.65	0.167
Bital	23.50	2.59	0.163
Bancomer	23.41	2.59	0.163
Santander Mexicano	23.21	2.57	0.162
Banamex - Aegon	23.20	2.57	0.162
Tepeyac	22.66	2.49	0.157
Garante	22.48	2.48	0.156
Inbursa	21.48	2.38	0.150
SYSTEM	23.60	2.61	0.164
CROMO	13.86	1.48	0.093

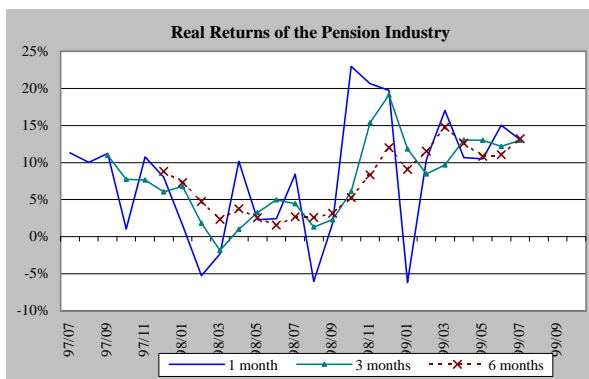
Benchmark used to calculate market returns: ICETI7
M2:Modigliani & Modigliani Risk Adjusted Performance Measure
Sharpe: Sharpe Ratio
IR: Information Ratio

Equivalent Commissions and Net Return to Workers

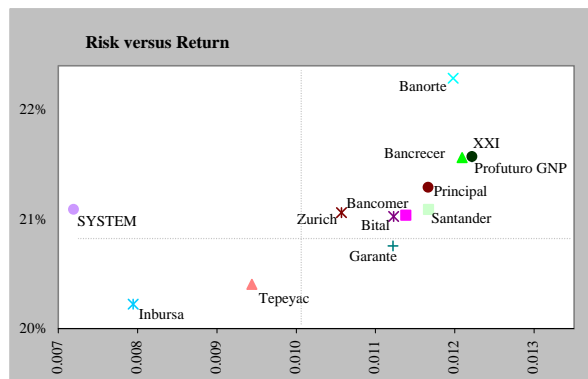
SIEFORE	Final Balance	Equivalent Commissions		Net Return
		Flow based Commissions	NAV Commissions	
Principal	263,824	1.50%	1.41%	8.14%
Bital	262,329	1.63%	1.55%	8.10%
Profuturo GNP	260,097	2.30%	2.29%	8.05%
Banorte	259,786	2.16%	2.13%	8.04%
Bancomer	247,381	1.64%	1.58%	7.71%
Banamex - Aegon	241,380	1.60%	1.53%	7.55%
Garante	232,879	1.86%	2.03%	7.31%
XXI	222,688	1.69%	1.64%	7.00%
Zurich	222,100	1.88%	1.86%	6.99%
Bancrecer	213,075	1.94%	1.94%	6.70%
Tepeyac	209,497	1.70%	1.67%	6.59%
Inbursa	192,297	2.75%	2.96%	6.00%
Santander Mexicano	185,001	2.54%	2.70%	5.73%
Simple Average	231,718	1.94%	1.95%	7.22%
*Weighted Average	236,374	1.97%	1.99%	7.36%

Assumptions:
25 years period with no initial balance
Three minimum wages as initial salary and an annual real growth rate of 1.5%.
The observed return and the commissions will remain constant for the given period

↑ Tables sorted by this column



Moving averages



Risk estimated using 91-day historical volatility
Before commissions returns'