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COMPARISON OF COSTS + FEES IN COUNTRIES WITH PRIVATE DEFINED CONTRIBUTION PENSION SYSTEMS

Please note that this paper has been superseded by IOPS Working Paper 20, '*Update of IOPS Work on Fees and Charges*', issued in April 2014.

THE INTERNATIONAL ORGANISATION OF PENSION SUPERVISORS

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ABSTRACT

Comparison of Costs and Fees in Countries with Private Defined Contribution Pension Systems

The fees and charges imposed upon pension funds are of great interest and importance to pension supervisory authorities as they have a significant impact on the amount of retirement income delivered to individuals, particular in the case of defined contribution (DC) pension schemes. Yet administrative fees are charged for services in different ways, with the diversity of charges and the specific details involved in each case making it impossible to directly compare administrative charges nationally and internationally. This paper therefore attempts to model such charges on a unified basis to allow for a standardized international comparison, known as the charge ratio. Explanations for the difference in charge ratios between countries are then proposed.

Keywords: Charge Ratios, Defined Contribution Pension Systems, Equivalent Fees, Mandatory Systems, Voluntary Systems.

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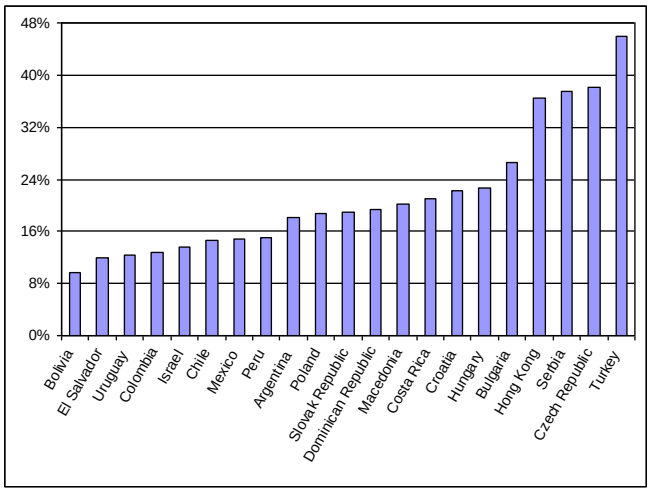
Executive Summary

The fees and charges imposed upon pension funds are of great interest and importance to pension supervisory authorities as they have a significant impact on the amount of retirement income delivered to individuals, particularly in the case of defined contribution (DC) pension schemes. However, due to the great national diversity of systems and fee charging methods, it is extremely difficult to compare such fees and charges internationally. This paper therefore models such charges on a unified basis, known as the charge ratio, to allow for a standardized international comparison, with the results presented in Figure 1 below. Though such standardized results should be treated with caution, some trends can be identified:

- Voluntary systems tend to have higher charge ratios (due to marketing costs etc.) – hence Turkey, the Czech Republic and Serbia are at the high end of the rankings.
- Some systems where there is a small number of providers show relatively lower charge ratios.
- Charge ratios decline over time, making older pension systems generally less expensive. The higher charges in Serbia and Turkey, for example, may continue to decline in future.
- Regulations, particularly those limiting asset based fees, can reduce costs in pension systems – but opportunity costs (of potentially higher returns) may be sacrificed.
- Regulations imposing minimum guarantees imply higher charge ratios.
- High contribution and wage rates deliver higher final balances and therefore lower charge ratios.

Figure 1: 40 Year Weighted Charge Ratio



It is important to note that whilst broad trends can be drawn from the analysis, as set out above, extreme caution should be exercised in drawing conclusions relating to individual systems. Some methodological limitations are set out in the body of the paper. Whilst the methodology accurately converts different charging methods into a single comparative figure, there are a variety of reasons why the underlying data might not be directly comparable. One example is that for those countries or jurisdictions where expense ratios are used as a basis for calculation, that data generally incorporates ***all*** expenses (not just fees charged by the scheme operators), which may not be the case in other countries where a breakdown of fees and charges are provided. Hence the high charge ratio of the Czech Republic and Serbia may be due to methodological reasons, and the pension system in these countries may not be so

relatively expensive in practice. In looking to individual systems, it is important to take into account the details set out in the body of this report and the "Explanations by Country" in ***part IV*** of this paper.

I. Introduction

Many IOPS member countries have reformed their public pension systems in the last three decades. These reforms have, in some cases, implied a radical shift from pay as you go systems, (which have been rendered financially unsustainable due to rising life expectancies), to mandatory fully-funded DC schemes. In other cases, the reforms include the introduction of a DC scheme which is complementary to the on-going defined benefit (DB) pension system. In the new schemes workers therefore "own" a personal retirement account in which employers, employees and sometimes governments deposit a certain proportion of wages or a fixed amount of money. These DC schemes accumulate resources over time and benefit from financial market returns in order to provide workers with an income source in old age. Furthermore, private pension schemes in other countries have increasingly moved from DB to DC as some corporations find it more suitable to offer a pension plan which allows its employees increased flexibility and full ownership of their retirement income.

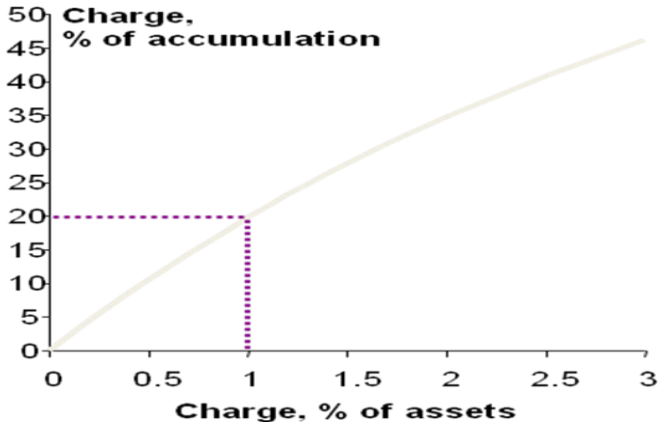
The fees and charges imposed upon pension funds are of great interest and importance to pension supervisory authorities as they have a significant impact on the amount of retirement income delivered to individuals, particularly in the case of DC pension schemes. Yet administrative fees are charged for services in different ways. The diverse charges and the specific details involved in every single case make it impossible to directly compare administrative charges nationally and internationally.

In order to contrast administrative fees properly one needs to construct indicators with unifying assumptions, but which take into account all the details in each case, as well as the country-specific wage level. Comparisons are made by projecting a value for a DC pension fund accumulated over the working life of the average worker in each country, using a fixed assumption for return on assets. This accumulated balance is then reduced by the charges on fees that each specific country's pension regulation imposes (or which the market in each country sets), thereby allowing for an international comparison. The amount by which the accumulated balance is reduced is known as the ***charge ratio*** – i.e. it measures the impact that any type of administrative charge can have on the final balance (for example after 40 years) of an individual retirement account compared to the hypothetical balance that could be obtained if no administrative fees were charged at all. This measure has been used to compare administrative charges in Latin America and in other countries with privately managed retirement savings accounts[1].

The other comparative indicator referred to in this report is the ***equivalent fee*** rate. This measure is related to the charge ratio but stated as an annual ratio for comparative purposes. The relationship between these two measures is shown in Figure 2, which compares in the horizontal axis the charge as a percentage of assets (or reduction in yield) and in the vertical axis the charge ratio (or reduction in premium), which shows the effect this charge would have on the final pension value (the charge ratio). Figure 2 shows that even low charges on assets build up over the long period of a pension investment can reduce the pension value substantially. For example, a charge on assets of 1% can reduce the value of the pension by around 20%.

[1] For example, see Whitehouse, E.R. (2001), "Administrative charges for funded pensions: comparison and assessment of 13 countries", in OECD, *Private Pension Systems: Administrative Costs and Reforms,* Private Pensions Series, Paris.

Figure 2: Relationship between Charge ratio and Equivalent Fee



Source: Whitehouse, E.R. (2001), "Administrative charges for funded pensions: comparison and assessment of 13 countries", in OECD, Private Pension Systems: Administrative Costs and Reforms, Private Pensions Series, Paris

In this report we analyse, based on available information, the different fees charged by pension fund managers to the member's accounts in three different groups of countries: Latin America, Central and Eastern Europe and other countries or jurisdictions[2] with DC, individual account based systems. The information and results for the first group has been taken from several reports including sources as the World Bank and OECD,[3] and CONSAR (Comisión Nacional del Sistema de Ahorro para el Retiro, The Commission for the National Retirement Savings System) in Mexico. The first group of countries includes: Argentina, Bolivia, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Mexico, Peru and Uruguay. The second group includes: Bulgaria, Croatia, Czech Republic, Hungary, Macedonia, Poland, Serbia and Slovak Republic. The third group includes: Hong Kong, Israel and Turkey. Some of the information for Hungary, Poland and Slovak Republic has been taken from OECD reports. Some of the information for the Czech Republic has been taken from World Bank reports.[4]

The countries or jurisdictions selected for inclusion in the report all operate DC, individual account style systems, where the data is available by each individual pension provider (except in the case of Hong Kong where data consolidated by type of pension fund is provided for confidentiality reasons). In the case of the Czech Republic and Turkey, the names of the pension fund providers are not given for confidentiality reasons. As the results will show, analysing and comparing results across even this relatively homogenous group of countries is difficult. Adding countries with completely different types of pension system (notably those with DB systems or occupational pension arrangements) would add only further difficulties and has therefore not been attempted.

The layout of this report is as follows. ***Section II*** presents an overview of the charges on fees of pension fund managers by region and country. ***Section III*** gives a summary of the characteristics and a comparison of the pension systems in these countries, with ***Section IV*** outlining the assumptions used in the analysis. This section provides a list of the information that is required per country, in order to obtain the results. ***Section V*** presents the results per country for equivalent fees, charged ratios and final balance in the account's member. ***Section VI*** attempts to provide some initial findings and the final ***Section VII*** concludes.

[2] Please note that, Hong Kong is a Special Administrative Region of China and is not a separate country. The territory may be referred to in this paper in the group of 'other countries' for ease of reference.

[3] See Chłoń-Domińczak, et. al, "Costs and charges of pension funds. International comparison and methods of approximation" in Institute for Structural Research, Warsaw, Poland. – *paper under revision, with publication due 2008/9*

[4] Czech Republic. Pilot Diagnostic Review of Governance of the Private Pension Fund Sector. March 2007. The World Bank.

II. Charges on fees of pension funds – overview by country and region

Table 1: Average Annual Administrative Fees Charged

Country Or Jurisdiction	Proportional Charge on Flows (% of Contribution)	Fixed Charge on Flows (US$)	Charge on Assets Under Management (% of net assets)	Charge on Returns (% of assets under management)	Charge on Excess Returns [a]	Fixed Charge on Transfer (US$)	Charge on Exit (as a % of total transferring member's account)	Social Insurance Agency Fee (% of Salary)	Charge on Death and Disability Insurance
Argentina	17.75%								1.35%
Bolivia	5.00%		0.21% [b]						
Chile	14.18%	$0.68							0.75%
Colombia	12.48%								1.40%
Costa Rica	3.28%			7.50% [c]					
Dominican Republic	5.88%				28% [d]				1.0%
El Salvador	11.97%								1.3%
Mexico	11.78% [e]		0.62% [e]						
Peru	15.29%								0.91%
Uruguay	13.46%	$0.35							0.06%
Bulgaria	5.00%		1%			$14.45			
Croatia	0.68% [f]		0.95%				0.47%		
Czech Rep			1.92% [g]						
Hungary	5.00%		0.57%						
Macedonia	6.85%		0.6% [h]						
Poland	7.00%		0.53% [h],[i]	0.03% [j]					
Serbia	2.21%		1.78%						
Slovak Republic	1.00%		0.78%					0.045%	
Israel	4.30%		0.39%						
Turkey	3.85%		2.35%						
Hong Kong			1.79% [k]						

a) Hong Kong has incorporated this fee into the charge on assets under management.

b) 3 different charges depending upon fund size: 0.2285% for AUM < US$ 1,000 M; 0.14% for AUM > US$ 1,000 M and AUM < US$ 1,200 M; and, 0.067% for AUM > US$ 1,200 M and AUM < US$ 1,500 M.

c) Costa Rica charges fees on nominal and real returns the average fee on nominal returns is 7.50%, whereas the average fee on real returns is 15.38%

d) The fee applies to the excess return paid over the interest rate of commercial banking CD's.

e) Most of the Mexican managers offer discounts in the proportional charge according to the worker's number of years in the system and a chronologically decreasing proportional charge on assets. From March 2008 the charge on flow fee has been eliminated, the only fee charged in actuality is the assets under management fee.

f) One of the pension fund managers in Croatia offers discounts in the proportional charge on flows which decreases annually up to a minimum.

g) No direct fees can be charged by pension funds in the Czech Republic. The participants are in the role of creditors for the pension fund and instead of fees they share jointly on all expenses and returns. Then, in order to be able to compare the data of the Czech Republic with other countries, we calculated an Expense Ratio based on expenses and assets under management per pension fund manager. This is assumed to be the fee on assets under management.

h) Annualised fees derived from our own calculations taking into account the monthly fees provided.

i) Average fee taking into account the value of Net Assets under Management per pension fund according to the following rules: PLN 8 billion and below 0.045%. Between PLN 8 and 20 billion, PLN 3.6 million + 0.040% of assets above PLN 8 billion. Between PLN 20 and 35 billion, PLN 8.4 million + 0.032% of assets above PLN 20 billion. Between PLN 35 and 65 billion, PLN 13.2 million + 0.023 of assets above PLN 35 billion. Above PLN 65 billion, PLN 20.1 million + 0.015 of assets above PLN 65 billion. Note: many funds have also implemented a nominal cap on management fee (e.g. PLN 120 million a year) in their statutes, and thus, the actual management fee may be lower than the maximum imposed by law.

j) This fee depends on the investment returns generated by the fund (max 0.06% - min 0.00% per annum). This fee is charged pro rata to investment returns; the PFM with the highest rate of return charges the full fee and the PFM with the lowest rate of return will not charge the fee at all. We use 0.03% as an average.

k) The average fee of Hong Kong's mandatory provident funds was 1.79% (asset-weighted) of net asset value (system wide expense ratio less non fee expenses). This figure includes the fees of any underlying investment structure. This figure is also higher than the actual fee charged as some service providers would rebate to individual members a portion of the fees (for example as a way of reducing the effective level of fees to employees of larger employers).

Table 1 provides an overview of the fees charged by country grouped into Latin American countries (LA), Central and Eastern Europe countries (CEE) and other countries or jurisdictions[5]. This Table shows based on the information provided by each country and jurisdiction that charges on flows exist for all countries except Hong Kong[6] and the Czech Republic. It can be noted that fees on assets under management are very common among CEE countries, contrary to the LA countries where only two countries (Bolivia and Mexico) charge this kind of fee. On the other hand, charges on returns, exit or transfer are not common. In addition, fees on death and disability insurance are only charged in LA countries.

It is worth mentioning that fees other than on flows, assets under management and returns have not been taken into account in this report as the model used assumes an individual accumulating a fund through time, with no withdrawals except for retirement at the end of the period of accumulation.

The numbers show that charges on flows are on average higher for Latin American (LA) countries (11.11%) than for Central and Eastern European (CEE) countries (3.5%). This is due to the wider spread of charges in Latin America, with Argentina charging as high as 17.75% of contribution when there are flows into the worker's account, vs. as low as 3.28% in Costa Rica. In CEE countries the maximum charge on flows is found in Poland (7.0%) and the minimum in Croatia (0.68%). The opposite is the case for the charge on assets under management, which are on average higher for CEE countries (1.02%), than for LA countries (0.42%). The latter is because in LA only two countries charge this kind of fee, both at reasonable low levels, whereas all CEE countries charge this fee with a minimum average of 0.53% in Poland and a maximum of 1.92% in the Czech Republic. The other countries, however, show the highest average assets under management fees (1.51%), as Turkey and Hong Kong levy the highest rates for this type of charge at 2.35% and 1.79% respectively. It is worth mentioning that the fees on flows for LA countries are usually given as a percentage of salary instead of percentage of contribution (which is how these are charged).

III. Pension system overview by country and region

The pension fund industries in Latin American countries are relatively unified in their design. The countries analysed in this report have mandatory pension funds based on individual choice. The legal framework includes both quantitative limitations on the investment portfolio as well as limits on the types and levels of charges that are levied on pension funds members. Pension funds were also established relatively recently which means that observations on the cost level are to some extent biased by the impact of the start-up costs.

The design of the pension systems in CEE shows certain similarities to those in Latin America. In particular, when preparing the reforms of their pension systems, national authorities looked into experiences of countries that had implemented funded systems with individual choice (in particular Chile), which explains similarities both in the approach to the charge structure and the structure of administrative costs.

[5] Detailed information on the different types of charged fees by country and each pension fund manager as of the first quarter of 2007 (the information for Macedonia, Serbia and Slovak Republic is given as of April 2008, for Hong Kong as of the fourth quarter of 2007 and for Hungary as of 2005) is available in the members' area of the IOPS website – www.iopsweb.org

[6] The few schemes in Hong Kong which provide for a contribution or withdrawal fee mostly waive these fees.

With regards to the charges of pension funds, the charge structure is an important element of the system design in the case of mandatory pension funds in Central and Eastern Europe. All of the countries limit the types of fees that can be charged by pension fund managers. The most frequent types are fees deducted from contributions and fees deducted from assets. In some cases fees based on the investment return and other fees that can be attributed to pension funds' operations are allowed. Countries also impose limits on charges. In the mandatory schemes these can be regarded as a way of protecting members' interests from excessively high costs. The introduction of charge limits can be important from a political perspective, especially at the initial stage of pension reform. With time, as systems mature, these limits can be relaxed.

Mandatory pension funds in the CEE region were established from the end of 1990s onwards. This stemmed from the need to reform the large, pay-as-you-go defined benefit schemes that were usually burdened with early retirement privileges and high costs. Additionally these countries experienced demographic changes related to demographic ageing, in particular a sharp drop in the birth rate. With the exception of the Czech Republic, Serbia and Turkey, the report focuses on those countries that carved out mandatory pension funds from the social insurance system (i.e. financed from social taxes), such as Poland, Bulgaria, the Slovak Republic and Croatia. In the broad sense, pension funds in this region are quite similar to funds in Latin America countries, but some solutions were adopted from developed countries. There are also some country peculiarities. In Hungary the pension system is also mandatory, but the construction of pension funds as mutual organizations is unusual. In the Czech Republic, the pension funds are voluntary and compliment the public pension scheme. In Serbia and Turkey, the existent pension funds are voluntary and act as the sole pension fund providers.

The structure of costs and fees paid by members (or by members from pension fund assets) is different between countries. The only similarity, as mentioned previously, is that all CEE countries with mandatory DC pension schemes analysed charge fees on flows and assets under management. The only exception, as previously discussed, is the Czech Republic which does not charge fees (either on flows or assets under management) as the participants act as creditors of the pension fund, and instead of fees they share jointly all expenses and returns.

The other countries analyzed are Turkey which operates a voluntary pension system and Israel and Hong Kong, where mandatory systems operate. The mandatory system in Hong Kong started to operate in December 2000. The Mandatory Provident Fund Schemes Ordinance ("MPFSO") and subsidiary legislation (collectively "MPF legislation") in Hong Kong contain very few direct requirements relating to fees and charges.

The structure of fees charged in Israel and Turkey is similar. Both countries charge on flows and assets under management. Turkey's pension system is relatively new, whereas Israel's is "older" with a few years now under operation. And although both countries also impose limitations on fees, these are relatively higher than other countries, especially in Turkey.

IV. Assumptions used in the calculations

The information provided by each country for modelling purposes was as follows:

1. A brief but technical description of the types of fees charged in each country scheme, such as:
   - i. Charges on Flows
     1. Proportional Charge on Flows
     2. Fixed Charges on Flows
   - ii. Charge on Assets under Management
   - iii. Charge on Returns
     1. Charge on Nominal Returns
     2. Charge on Real Returns
     3. Charge on Excess Returns.
   - iv. Entry or Withdrawal fees
     1. Any other charges used in the country but not included in the list above.
2. The actual fees charged by each pension fund manager in a recent date (September 2007 and some of them provided updated information as of April 2008).
3. The fees that have been charged in the past by each pension fund manager in December for the following years: 2007, 2006, 2005, 2004, 2003, 2002, and 2001.
4. The wage on the average worker which contributes to the pension system (this is important in order to know how big fixed charges are relative to contributions).
5. The exchange rate with respect to the dollar in every period December 2001-2006, and in September 2007.
6. Assets under management for each pension fund manager for each December 2000-2006 (in order to be able to calculate weighted averages of equivalent fees for each country –an important summary statistic).
7. Gross contribution to the individual account as a % of the wage and net contribution if any fraction of the gross contribution is set aside for other purposes (such as insurance or disability).
8. Any other details which will allow the staff in charge of making the calculations to understand the way the gross contribution translates into a net contribution of a possibly lesser amount.

Specifics about pensions used in our calculations by country are provided in Table 2.

Table 2: % of contribution to pension funds and average wages per country

Country	Average monthly wage (US$) [a] Wage as of Q1 2007	Contribution to the individual retirement account (as a % of gross wage)
Argentina	581	7% of base salary less Death and Disability Insurance Fee
Bolivia	312	10% of base salary
Bulgaria	306 [b]	5% to a universal pension fund
Chile	714	10% of base salary
Colombia	442	11% of base salary
Costa Rica	500	4.25% of base salary
Croatia	1146	15% to the mandatory first pillar + 5% to the mandatory second pillar [c]
Czech Rep	1107	2.32% [d]
Dominican Republic	374	8% of base salary
El Salvador	470	10.3% of base salary
Hong Kong	1295 [e], [f]	10% [c]
Hungary	724 [b]	8.0% of base salary
Israel	1412	11.5% [g]
Macedonia	504 [h]	7.48%
Mexico	584	7.9% of base salary
Peru	681	10% of base salary
Poland	1128 [b]	7.3% of base salary
Serbia	881 [h]	6.3% [d]
Slovak Republic	1032 [h]	9%
Turkey	1008	9% [i]
Uruguay	552	15% of base salary less Death and Disability Insurance Fee

a) Average salary of persons contributing into pension funds.

b) Average salary for employed persons in the country.

c) Subject to maximum and minimum salary levels.

d) Based on worker's average contributions to voluntary pension systems and average wages.

e) Median monthly employment earnings in Hong Kong.

f) Information given as of the fourth quarter of 2007.

g) Only from employer and employee, excluding the compensation contribution of 6%.

h) Information given as of April 2008.

i) According to a survey conducted by a research company in 2007 (sample size: 1,510 participants) and provided to us by Turkey.

Table 2 shows the average monthly wages in U.S. Dollars (as of the first quarter 2007 except for Hong Kong which is given as of the fourth quarter of 2007, and Macedonia, Serbia and Slovak Republic given as of April 2008) and the contribution made by the worker into the pension fund, as a percentage of gross wages. It can be noted from this Table that, Croatia, the Czech Republic, Hong Kong, Israel and Poland have particularly high monthly average wages. On the other hand, Bolivia and Bulgaria have lower average wages than the rest of the group. This, of course, affects the final balance obtained in the worker's account, at the end of the 40 years projection period. These results will be discussed in ***Section V***. Also, it can be noted from Table 2, that the contribution made into the pension fund is relatively low in the Czech Republic (2.32%[7]) and Costa Rica (4.25%), which will also affect the final balance obtained. All the other contributions range from 5% (in Bulgaria) to 20% (in Croatia). Croatia is an interesting case, having one of the highest average wages and the highest percentage of contribution, which consequently results in the highest final balance in the worker's account, as the charge fees are quite low - see Table 1. Following the same understanding, Costa Rica will give the lowest final balance due to the low percentage of contribution - see ***Section V***.[8] **Appendix 1** provides further detail on the methodology for deriving the results.

In order to be able to compare the fees charged by each of the pension fund managers and per country, assumptions which vary within each specific country are necessary. The following list gives the general assumptions applied to all countries and jurisdictions for which calculations have been made (i.e. Bulgaria, Croatia, Czech Republic, Hong Kong, Hungary, Israel, Macedonia, Poland, Serbia, Slovak Republic and Turkey)[9]:

1. An average worker joins a mandatory (or voluntary for Czech Republic, Serbia and Turkey) defined contribution pension fund in 2007 (or 2008 for Macedonia, Serbia and Slovak Republic).
2. This worker (or employee) joins with no initial assets on his or her account (this could be an individual on initial working age or who undertakes his or her first job).
3. Some certain actuarial characteristics of this worker, such as age, marital status, risk aversion, etc.; are not taken into account for this analysis, as no survival probabilities are used in the model (i.e. the probability of surviving certain period, or the probability of disability, or the probability of the spouse surviving, etc.).
4. Then, from the point above, we assume that this average worker does not retire before the period of projection of 40 years and that no withdrawals are assumed other than for retirement (then, no disability, or death is assumed).
5. Two periods for the projection of the worker's pension fund are assumed: 25 and 40 years. However, the results presented in this report are for 40 years of projection only, as this is the common period of accumulation of an individual and for the sake of brevity. The results for 25 years (and other detailed results and information) are

[7] This is because we are analysing the contribution made into the voluntary pension system in the Czech Republic, which is relatively low compared with mandatory pension systems.

[8] Further comments on contributions:

In Hungary, the contribution – so called membership fee – is regulated by the law. The rate of contribution was set at 6%. There was planned to increase the rate to 8% in 2004, but due to political reasons the initial schedule was postponed. Contributions are paid by members from their salaries, withheld and transferred by the employer in a decentralized manner, which makes the Hungarian system distinct from other systems in the region that have centralized contribution collection. There are special accounting requirements as how to divide contributions. There is a coverage reserve which corresponds to individual account, an operational reserve to cover operational costs of fund and liquidity reserve. The profits of the fund are also divided into three reserves.

[9] Please note that the results for the Latin American countries were produced by the Mexican supervisory authority, CONSAR, using the same methodology.

available in the ***ANNEX*** of this paper which is available to IOPS members' in the private area of the IOPS website.

6. The fund's worker increases by making yearly contributions (or flows) made at the middle of the year (that is, the worker increases his or her account by yearly contributions).
7. The assets on his or her fund are invested at an annual rate of 5%. This is taken to be able to compare results with CONSAR's calculations for Latin American countries and a sensitivity analysis is made in ***Appendix 2***, to investigate possible effects on changes on rates of return.
8. The flows are made as a percentage of the worker's annual salary, according to the regulations of each country.
9. The worker's annual salary is assumed to be constant over time. However, a sensitivity analysis is performed in ***Appendix 2*** to investigate the feasibility on our assumption.
10. These flows are decreased by applying charge fees on flows depending on each pension fund manager by country.
11. The annual final assets are decreased also by applying charge fees on assets under management by pension fund manager and by country.
12. Some pension fund managers charge fees on transfers between funds and charges on exits. These fees are taken into account according to the model used in this analysis.

Assumptions by specific country or jurisdiction:

1. Bulgaria, Hong Kong, Hungary, Poland: we have assumed the average monthly salary for the country (median monthly employment earnings in the case of Hong Kong), which may not coincide with the monthly average salary for the participants in pension funds (which was not available).
2. Czech Republic: the results are based on our own calculations for an "expense ratio", which is the proportion of the total expenses charged and the total assets held by each pension fund.
3. Hong Kong: the results are based on the information submitted by trustees in respect of constituent funds with financial year-ends from 30.9.2006 to 30.06.2007 (the latest available information), on an asset-weighted basis.
4. Serbia: the actual fees on flows and assets under management in Serbia, i.e. 2.48% and 2%, were reduced 11% each, in order to eliminate the transaction costs (costs caused by trading with securities, real estates and other assets of the fund, such as, but not limiting to, costs of broker, stock exchange fees, custody bank costs, central securities depositary and cleaning house costs, tax costs, costs of real estates assessment and real estate insurance etc.), which are paid by the management company and not by the member. This 11% was provided by Serbia and the source is:

   http://www.nbs.rs/export/internet/english/62/62_2/index.html - supervisory reports.
5. Macedonia and Poland: these countries provided monthly fees on assets under management. These were annualised with our own calculations by multiplying the monthly figure by 12.

V. Results

Figure 3: 40 Year Weighted Charge Ratio

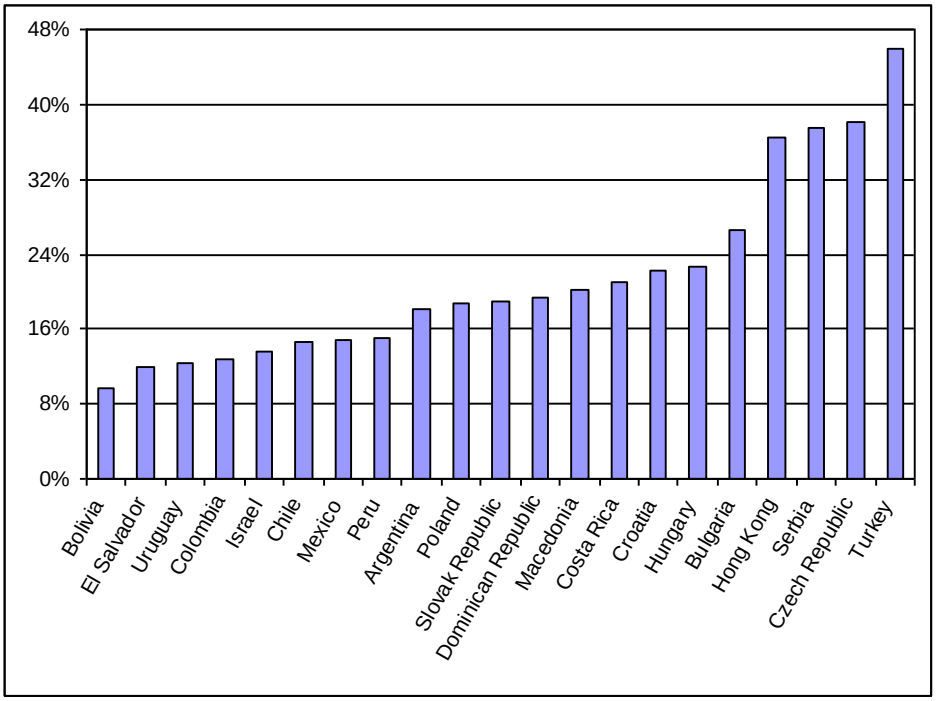


Figure 4: 40 Year Weighted Equivalent Fee

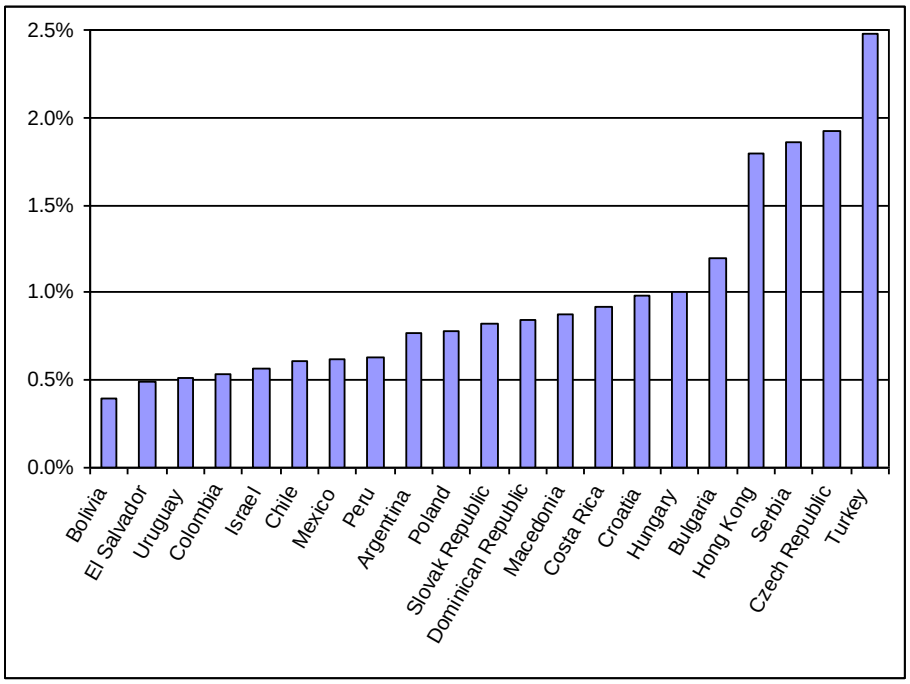


Table 3: 40 Years Charge Ratio and Equivalent Fee

	40 Years Charge Ratio	40 Years Equivalent Fees
Bolivia	9.70%	0.39%
El Salvador	11.97%	0.49%
Uruguay	12.39%	0.51%
Colombia	12.73%	0.53%
Israel	13.67%	0.57%
Chile	14.61%	0.61%
Mexico	14.87%	0.62%
Peru	15.01%	0.63%
Argentina	18.09%	0.77%
Poland	18.74%	0.78%
Slovak Republic	19.03%	0.82%
Dominican Republic	19.35%	0.84%
Macedonia	20.24%	0.88%
Costa Rica	21.07%	0.92%
Croatia	22.21%	0.98%
Hungary	22.57%	1.00%
Bulgaria	26.51%	1.20%
Hong Kong	36.42%	1.79%
Serbia	37.51%	1.86%
Czech Republic	38.14%	1.92%
Turkey	45.88%	2.48%

Table 4: 40 Year Equivalent Fee Descriptive Statistics per Country

Country	Min	Max	Range	Weighted Average	Std. Dev.	Variation Coefficient
Argentina	0.69%	0.83%	0.14%	0.77%	0.05%	6.87%
Bolivia	0.39%	0.39%	0.00%	0.39%	0.00%	0.27%
Bulgaria	1.20%	1.20%	0.00%	1.20%	0.00%	0.00%
Chile	0.56%	0.69%	0.13%	0.61%	0.04%	7.29%
Colombia	0.46%	0.58%	0.12%	0.53%	0.04%	8.42%
Costa Rica	0.69%	0.98%	0.29%	0.92%	0.13%	14.01%
Croatia	0.97%	0.98%	0.01%	0.98%	0.01%	0.56%
Czech Republic	0.77%	2.84%	2.07%	1.92%	0.55%	28.67%
Dominican Rep	0.64%	0.84%	0.20%	0.84%	0.09%	10.80%
El Salvador	0.49%	0.49%	0.00%	0.49%	0.00%	0.00%
Hong Kong	NA	NA	NA	1.79%	NA	NA
Hungary	0.48%	2.24%	1.76%	1.00%	0.56%	56.36%
Israel	0.12%	0.74%	0.62%	0.57%	0.17%	30.12%
Macedonia	0.88%	0.88%	0.00%	0.88%	0.00%	0.00%
Mexico	0.46%	0.88%	0.42%	0.62%	0.12%	18.96%
Peru	0.54%	0.70%	0.16%	0.63%	0.07%	11.62%
Poland	0.74%	0.82%	0.08%	0.78%	0.03%	3.83%
Serbia	1.86%	1.89%	0.03%	1.86%	0.01%	0.80%
Slovak Republic	0.82%	0.82%	0.00%	0.82%	0.00%	0.00%
Turkey	2.02%	3.58%	1.56%	2.48%	0.44%	17.67%
Uruguay	0.42%	0.65%	0.23%	0.51%	0.11%	20.89%

NA: Not Available

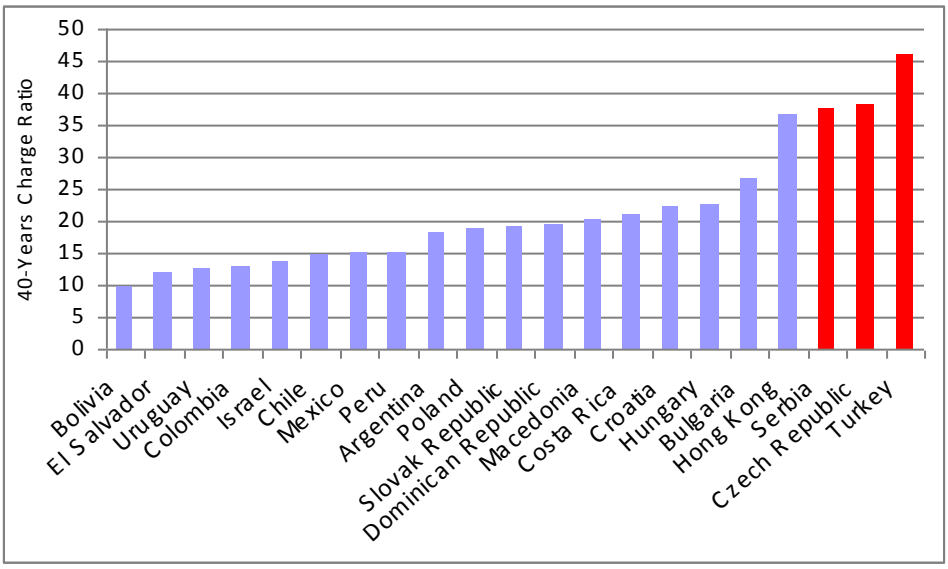
VI. Analysis

Various factors have been examined to see if they can provide explanations for the charge ratio results derived. Factors exogenous to the model used are first examined, followed by an examination of how the assumptions used in the model may drive the results.

1. Exogenous factors

i. Voluntary systems

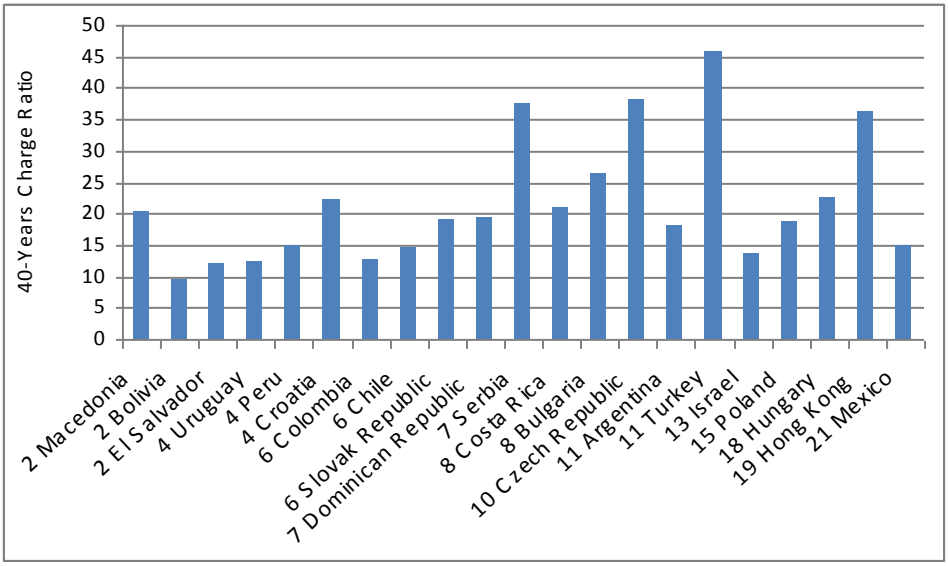
Figure 5: Voluntary Systems



One result suggested by the charge ratio comparison is that voluntary systems (highlighted in red) tend to be more expensive (e.g. as is the case with the Czech Republic, Serbia and Turkey). This is to be expected, as additional marketing and sales costs are involved, encouraging members to participate in voluntary systems.

ii. Ranking by Number of Providers

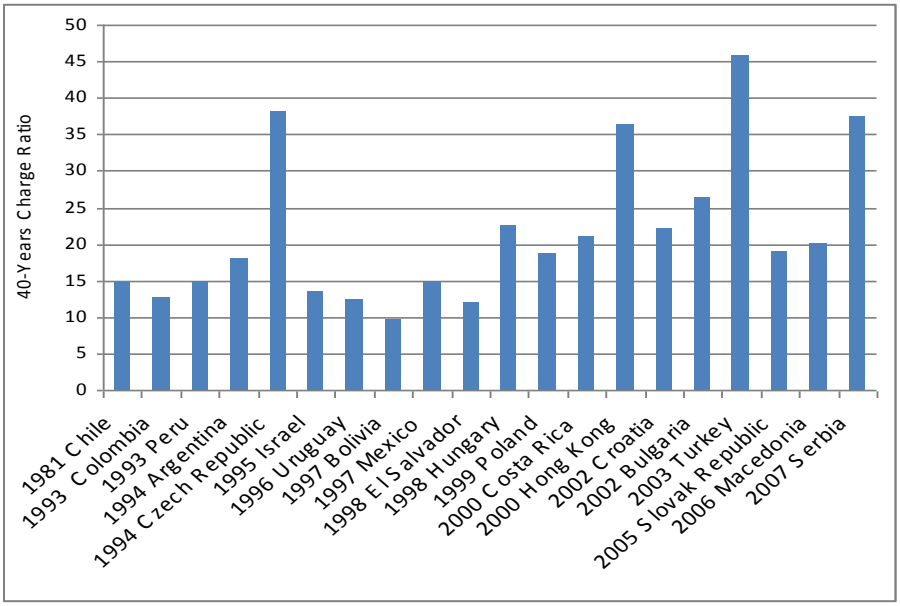
Figure 6: Ranking by Number of Providers



Another conclusion which can be drawn is that some systems with more providers tend to be more expensive. Whilst this trend is clear, it is somewhat inconsistent. Countries where the number of providers is very limited, i.e. Macedonia and Bolivia with only 2 providers, are relatively cheaper, whilst some of those allowing multiple providers are more expensive, i.e. Turkey and Hong Kong with 11 and 19 respectively. However, there are some countries which do not follow this trend. Poland, on one hand, is one of the cheaper countries with multiple providers i.e. 15. Also, Mexico with the highest number of providers, i.e. 21, is relatively less expensive than Hong Kong and Turkey. For the majority of the countries, economies of scale may be found where limited providers operate in a market, whilst where there are multiple providers they will have to compete for business, which will involve marketing and sales costs.

iii. Ranking by date system introduced

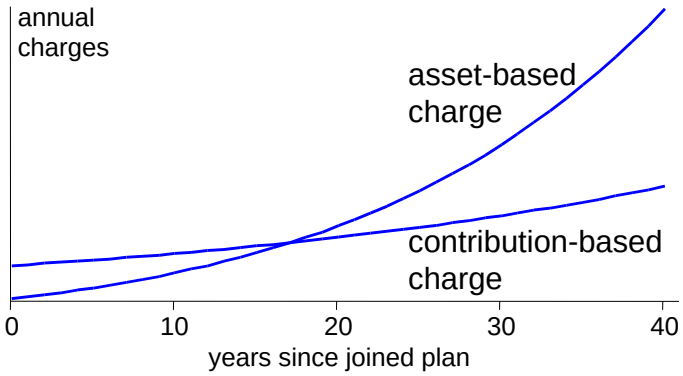
Figure 7: Ranking by Date System Introduced



The age of the system can be expected to provide some explanation (as fixed set up costs are absorbed and economies of scale develop), and some correlation with the charge ratio comparisons can be found. For example, the older systems in Chile and Colombia are relatively cheaper, whilst some of the systems set up in Eastern Europe and Asia since 2000 are still relatively expensive and may therefore be expected to decline in future (notably the system in Serbia which was only launched last year). However, it should be noted that Macedonia has one of the newest pension system analysed but already has a relatively average charge ratio. Meanwhile, the Czech Republic operates one of the oldest systems and also one of the most expensive.

One methodological issue is that the model may overstate the long-term impact of those systems, such as the Czech Republic and Hong Kong, using asset based fees. For most systems the overall level of fees and charges will fall as the system grows and matures. Reductions over time in asset-based fees have a greater long-term impact because the reduction impacts on all funds (whenever contributed) each year. By contrast a reduction of a charge on the flow only impacts on future contributions as the former (higher) fee level has already been deducted from prior contributions and this amount can never be reduced. The relationship between these two different ways of levying charges and their impact over time is shown in Figure 8. From the figure it is shown that the asset-based charge has a higher impact on the pension fund through the time, than the contribution-based charge. Therefore, at the end of the 40-years period of projection, the annual charges on assets will double the charge on contributions.

Figure 8: Pension funds' revenue streams under different types of charge

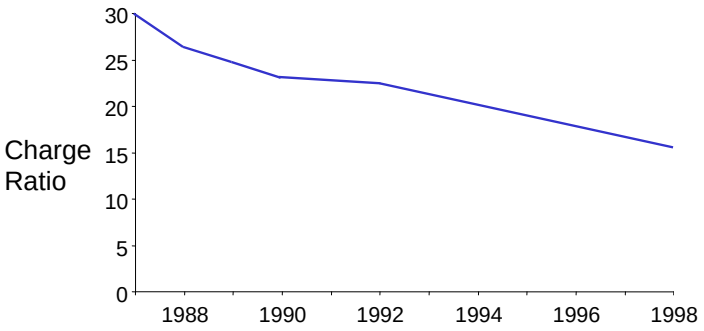


Source: Whitehouse, E.R. (2001), "Administrative charges for funded pensions: comparison and assessment of 13 countries", in OECD, *Private Pension Systems: Administrative Costs and Reforms,* Private Pensions Series, Paris

The Latin American countries, charging contribution based fees, may therefore look cheaper than other countries for methodological reasons. Contribution based fees, such as those in Latin America, may also be lower than the model implies as a full (i.e. 40 year) contribution period is assumed, where as the actual contribution period in many countries is of course much lower. The model also does not take into account the death and disability fees charged in Latin American countries.

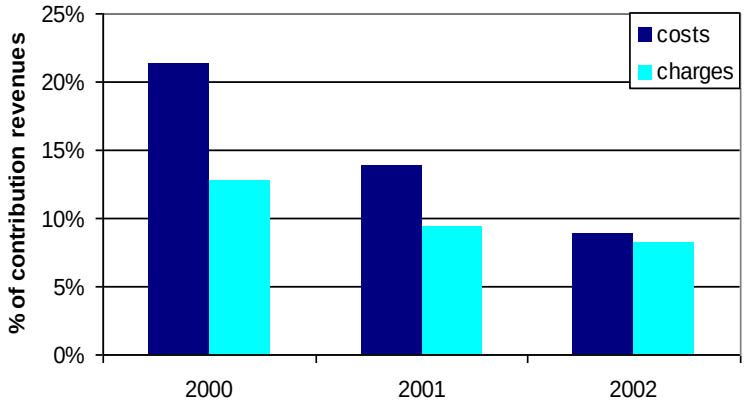
An important assumption of the calculations above is that charges remain constant until pensions are withdrawn. But pension providers' revenues, especially from charges on fund assets, are back-loaded while expenses are front-loaded because of set-up costs. The pension fund industry in most countries also tends to consolidate over time, which can exercise a downward pressure on costs. The charge ratios of some of the systems which have been set up since 2000, as in the case in Turkey, Serbia or Hong Kong, may therefore be overstated, as costs may be expected to decline in line with experience in some longer standing systems. For example, see Figure 9 where it is shown that the charge ratio in Chile declined by almost half in the first 10 years of the operation of the individual account system, whilst in Figure 10 it is shown that costs in Poland were also reduced considerably in the first few years after the pension system was reformed.

Figure 9: Evolution of average pension administrative charges in Chile



Source: Whitehouse, E.R. (2001), "Administrative charges for funded pensions: comparison and assessment of 13 countries", in OECD, *Private Pension Systems: Administrative Costs and Reforms,* Private Pensions Series, Paris.

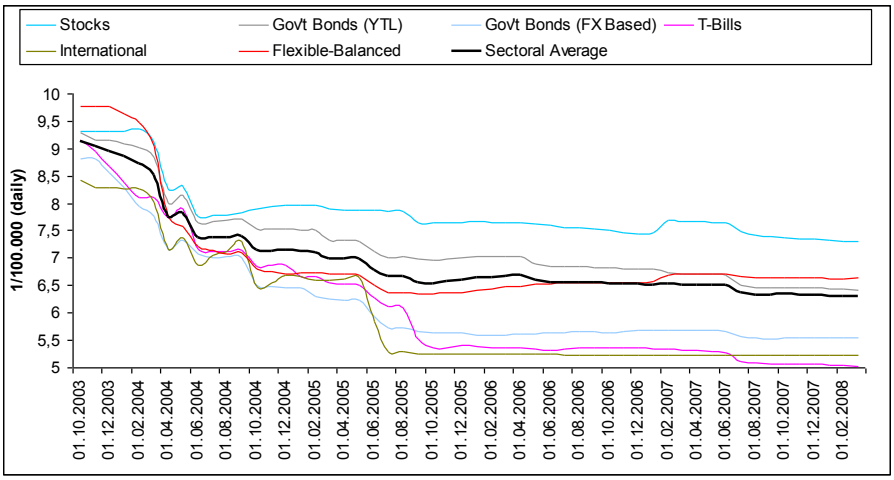
Figure 10: Costs and Charge in Poland



Source: Chlon-Dominczak, A. (2004), Evaluation of Reform Experiences in Eastern Europe" in: *Pension Reforms: Results and Challenges,* FIAP, 2004

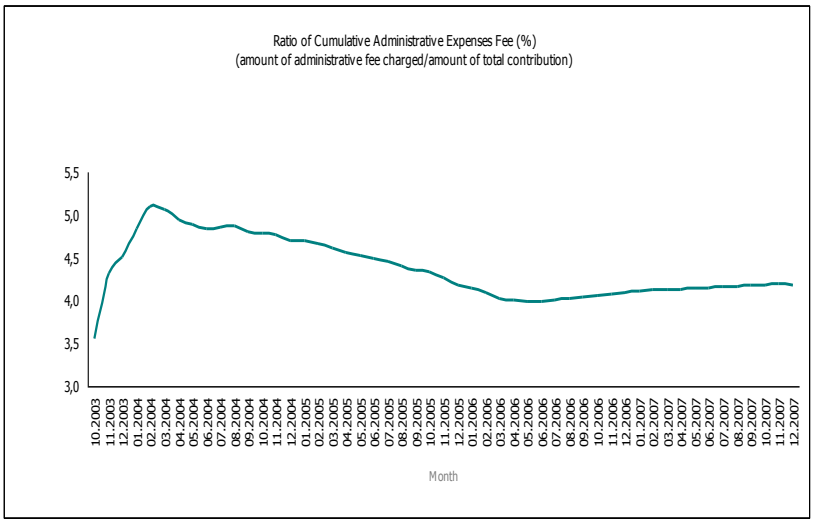
The country, which the model shows as having the highest charge ratio, Turkey, is a relatively new system (having been introduced in 2003). Charges have declined since the launch of the system, and may continue to do so over time, see Figures 11 and 12.

Figure 11: The development of asset management fee averages in Turkey



Source: Turkish Treasury

Figure 12: The development of charges on flows averages in Turkey



Source: Turkish Treasury

iv. Legislative restrictions

Table 5 shows the regulatory limits on fees for each of the countries analysed. Notably, the systems in Croatia, Macedonia, Bolivia, Slovak Republic and Costa Rica were deliberately set up to be low cost.

Costs in Bolivia are low due to limited investment options (with 90% of pension assets invested in domestic treasury bonds). The relatively lower costs in Croatia and Poland are due to the constant changes they have had in their fee structure. Some amendments are still under consideration (Chłoń-Domińczak, et. al – see footnote 2).

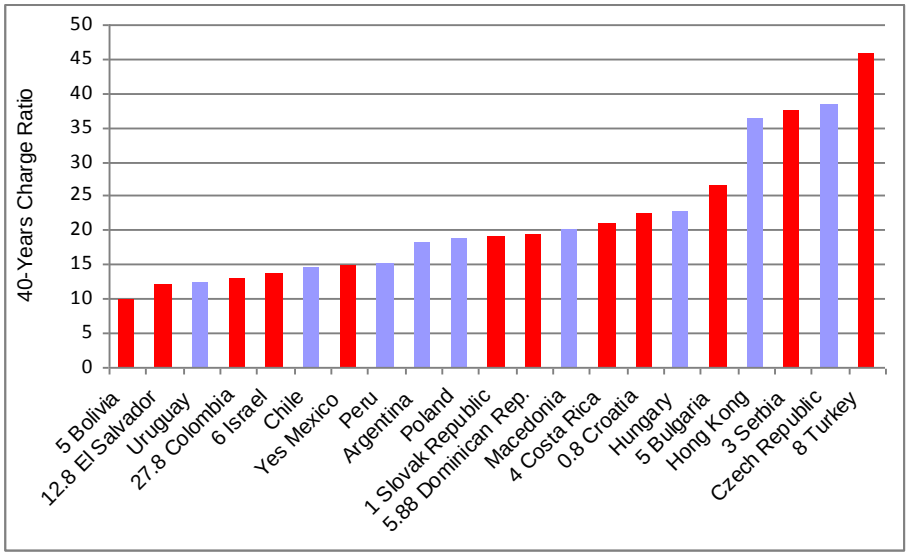
It should therefore be noted that low costs may come with an 'opportunity cost' attached, as flexibility, choice, and potentially higher returns may be sacrificed[10].

[10] The relationship between investment regulation and performance is currently being explored in a World Bank / OECD project.

Table 5: Regulatory Limits on Fees per Country

Country	Limit on Contribution Fee (% of contribution)	Limit on Asset Fee (% of assets)	Limit on Returns Fee (% of assets)	Charge on Excess Returns
Bolivia	5	0.2285		
Bulgaria	5	1		
Colombia	27.82			
Costa Rica	4		8	
Croatia	0.8	0.95		
Dominican Republic	5.88			30
El Salvador	12.825			
Israel	6	0.5		
Macedonia		Yes		
Mexico	25-Year Flow Fee Average for the Country			
Poland		0.54	0.06	
Serbia	3	2		
Slovak Republic	1	0.78		
Turkey	8	3.65		

Figure 13: Limitation on Contribution Based Fee

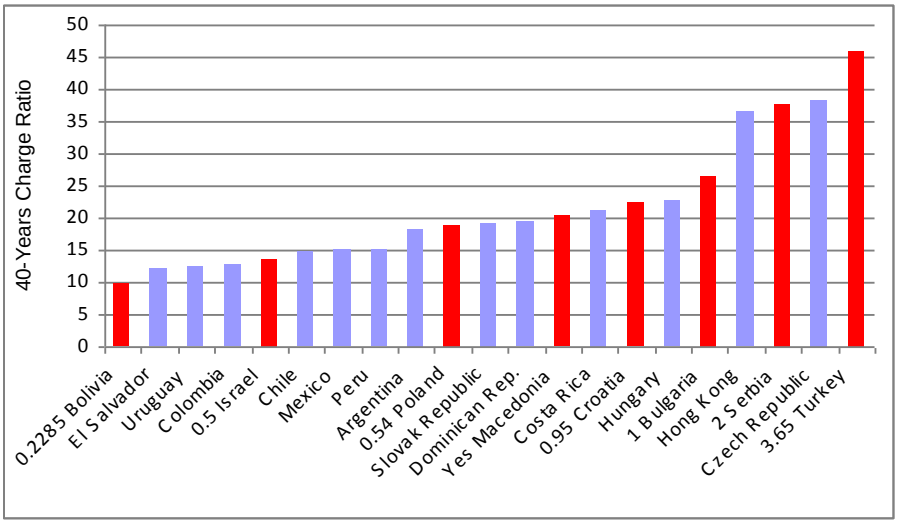


There is a wide range of limitations on flow fees as shown in Figure 13. Croatia and Slovak Republic, on one hand, have low limits on the fees charged (i.e. 0.8% and 1%), making these countries relatively restrictive. However, they do not rank amongst the lowest charge ratios as the charges on assets under management applied in these two countries are relatively high compared with elsewhere. On the other hand, Colombia and El Salvador do not impose tight restrictions on flow fees (i.e. 27.8% and 12.8%), yet these two countries rank amongst the lowest charge ratio countries. This is for two main reasons. First, the pension fund managers in these countries do not charge fees at or near the regulated limit but well below, and secondly, neither of these countries charges fees on assets under management which makes the charge ratio lower.

Another important case to note is Serbia, which is the second most expensive. This is due to two main reasons. First, pension fund managers in Serbia charge high fees on flows which

are quite close to the limit of 3% (i.e. 2.13%). Second, the charge on assets under management is at the maximum limit imposed (i.e. 2%). The high limits in Turkey also make this a relatively quite expensive system.

Figure 14: Limitations on Asset Based Fees

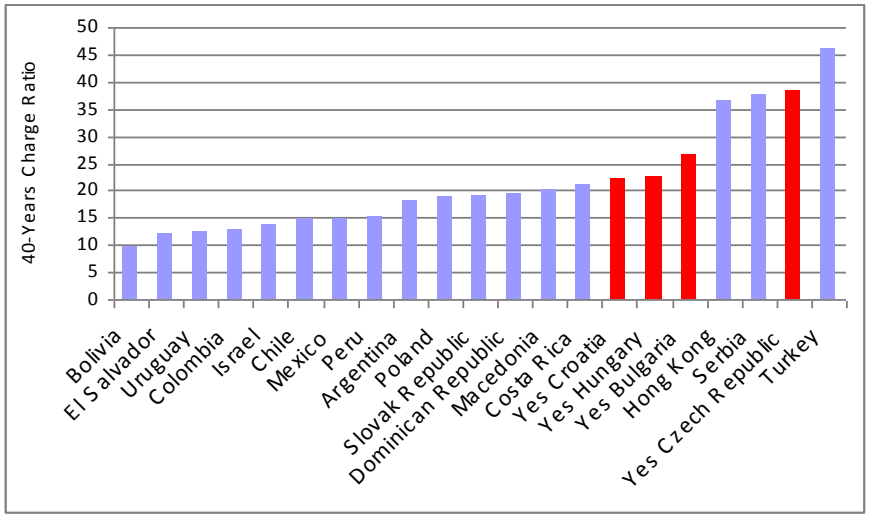


The range on the limitations on asset based fees is not as wide as in the flow based fees, as Figure 14 shows. The limits vary from 0.2285% to 2%, with the exception of Turkey which limit is relatively higher than other countries (i.e. 3.65%). The highest charge ratios belong to countries and jurisdictions where either there are no restrictions, as in Czech Republic and Hong Kong, or the limits are high, as in Serbia and Turkey. The lowest belong to restrictive countries as in Bolivia, Israel, Poland and Macedonia. Strictly limiting asset based fees does, therefore, seem to show some correlation with lower charge ratios.

In terms of other regulation, actual costs in Latin America can be expected to be higher as this is the only region which applies charge fees on death and disability insurance.

v. Minimum rates of return guaranteed

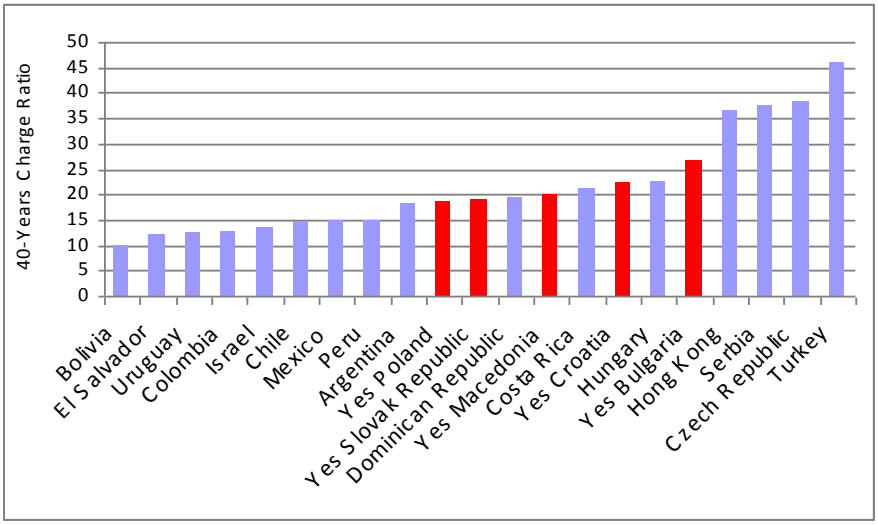
Figure 15: Minimum Rates of Return Guarantee



Examining countries which offer minimum rates of return guaranteed to the contributors to the pension system (highlighted in red on the graph) does appear to provide some correlation with charge ratios. Intuitively, such guarantees may increase costs as reserves and other solvency protection may be required.

vi. Central collection

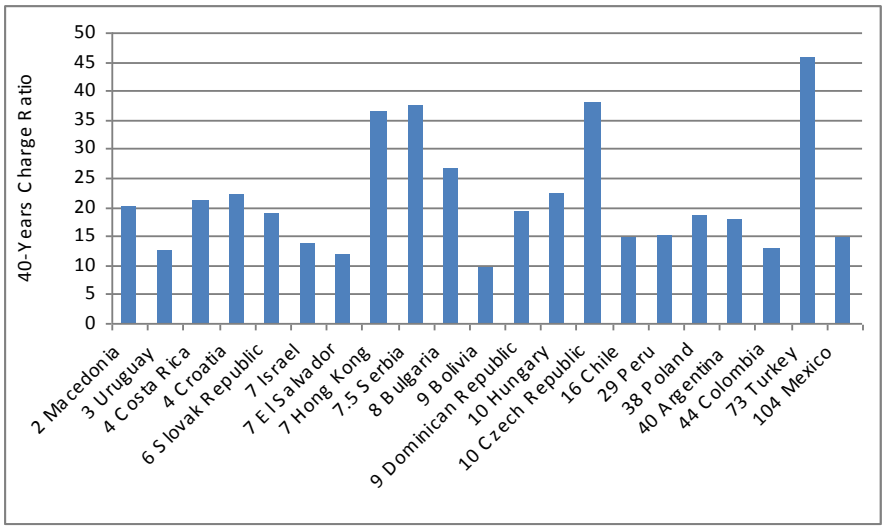
Figure 16: Central Collection



The above graph shows in red the countries which operate under a central collection system, where a sole institution collects the contributions to the different pension funds. The central collection does not seem to make any overall costs lower, as might be expected. This may be as in some countries where funds are charged for this service (e.g. in Poland 0.8% is charged to funds, where as 0.5% is charged to members in Slovakia).

vii. Demographic and economic factors

Figure 17: Ranking by Population Size[11]



[11] Data for Turkey and Israel is given as at 2005

Ranking countries' charge ratios by the size of population (and therefore potential size of the pension system) does not seem to have much explanatory effect, see Figure 17. The largest countries by population, i.e. Mexico and Turkey, rank in the middle and the top of the charge ratios, whilst the smallest countries such as Macedonia and Uruguay are in the middle, which belies expectations of economies of scale.

Figure 18: Ranking by Assets as % of GDP

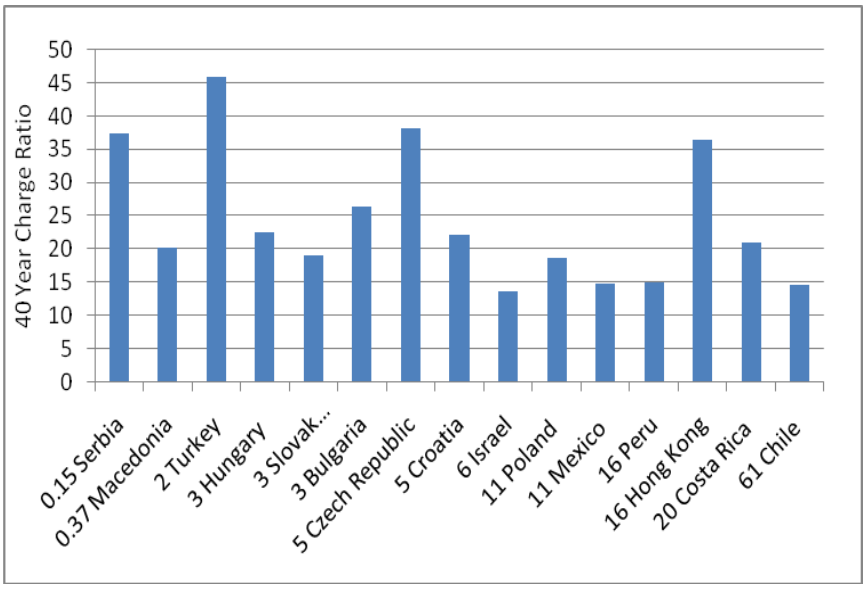
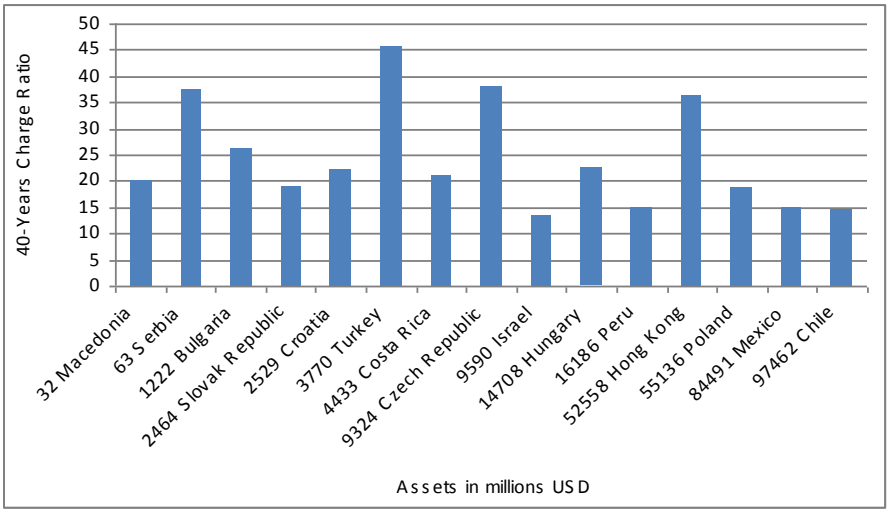


Figure 19: Ranking by Assets in U.S. Dollars



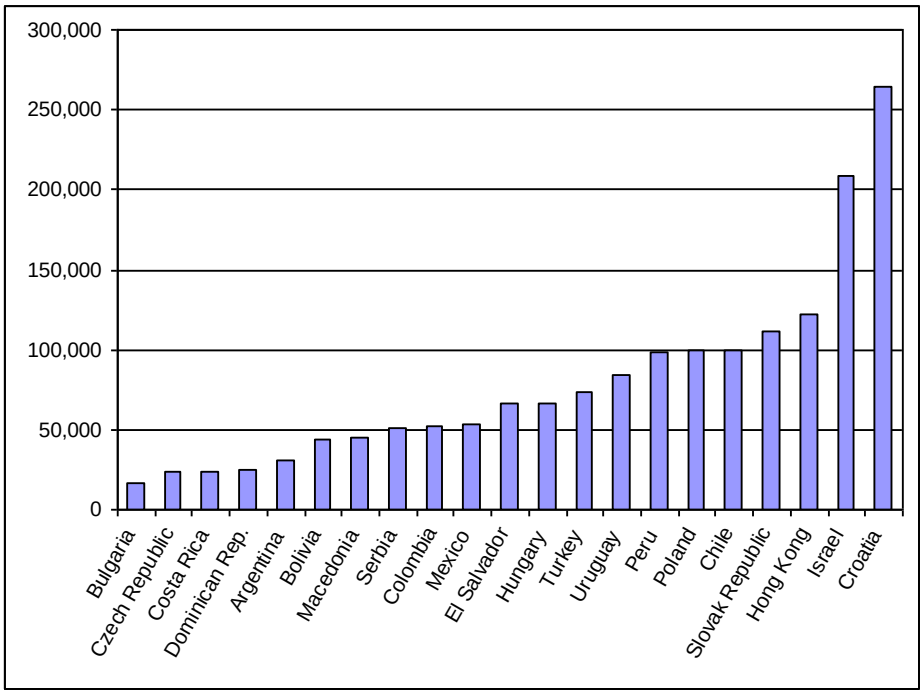
Figures 18 and 19 show the total assets held by the pension fund managers per each of the countries or jurisdictions. When looking at the assets as a percentage of the total GDP in Figure 18, it is noted that equally increasing the size of pension assets does not seem to imply lower charge ratios, again suggesting that potential economies of scale do not have much explanatory power. The same applies when looking at Figure 19. The country holding the highest value of assets is Chile with the lowest being Macedonia with only 32 millions. These does not have any effect on charge ratios as Macedonia and Chile rank in the middle to lower end of the charge ratio rankings.

2. Assumptions and methodological results

As there seem to be limited exogenous factors explaining the differences in charge ratios internationally, it may be that the inputs and assumptions used in the modelling and the methodology have to be examined to explain the results.

i. Inputs

Figure 20: Final Balance by Country (U.S. Dollars)



The final balance per country, shown in Figure 20, is derived from the wage rate, the contribution rate and the fees charged applied over the 40 year period. The results for final balance per country show that there is a large difference (more than 200,000 U.S. Dollars) between the largest, i.e. Croatia, and the smallest, i.e. Bulgaria. This is due to the contribution in Croatia is the highest and Bulgaria holds the lowest (see Figure 23).

As the charge ratio depends on the total charges relative to the final balance, where the final balance is higher (i.e. contribution or wage rates are higher), *ceteris paribus*, the charge ratio will be lower.

Figure 21: Ranking % of Contribution Rate per Country

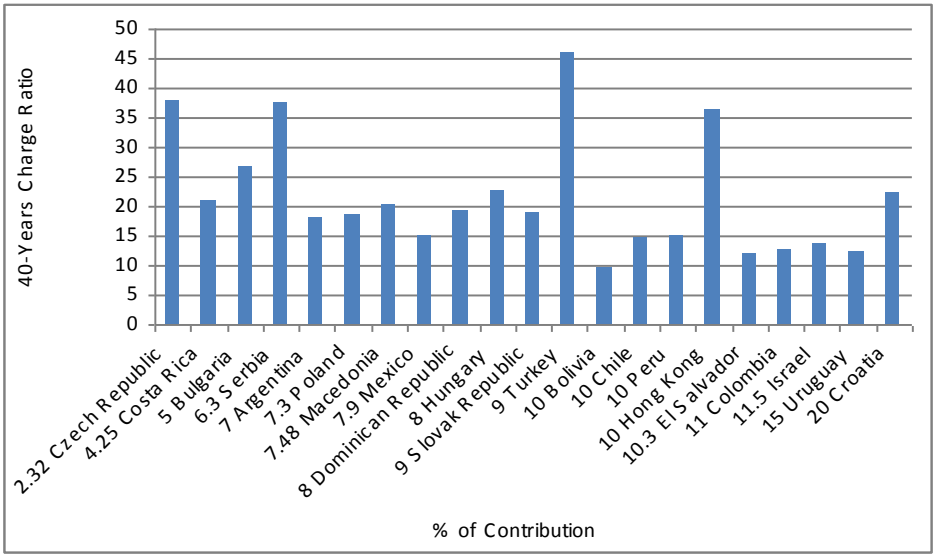


Figure 21 shows that there is not a direct relationship between percentage of contribution and charge ratio levels. Two interesting cases are Czech Republic which holds the smallest percentage of contributions to the fund and one of the largest charge ratios. This is because the level of wages and charge fee, which is a high due to the voluntary nature of the system, as previously explained. The second interesting case is Croatia, which holds the largest proportion of contribution to the fund, and a relatively small charge ratio. This is due to the low fees charged in Croatia. However, in Croatia the contribution is made into a mandatory pension fund.

Figure 22: Ranking Monthly Average Wage per Country

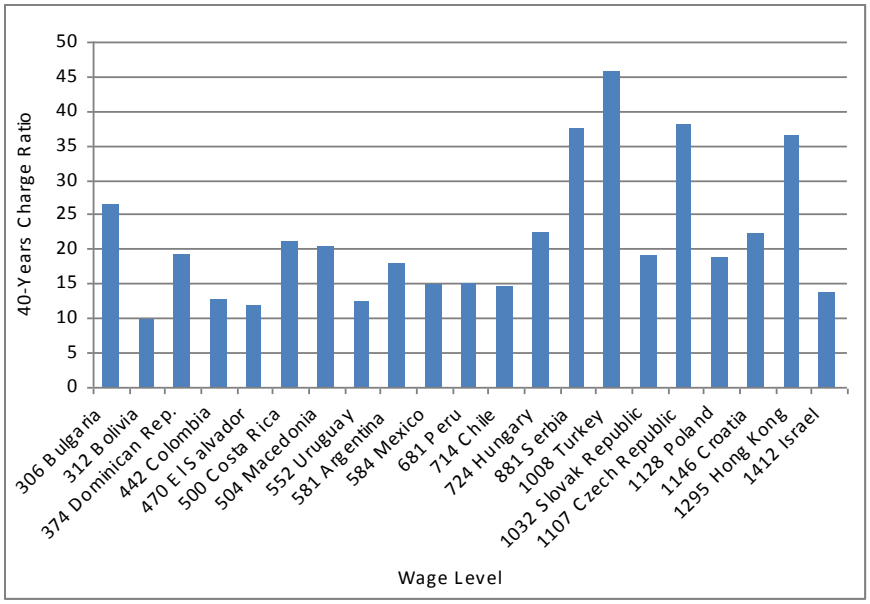


Figure 23: Ranking Average Annual Contribution per Country

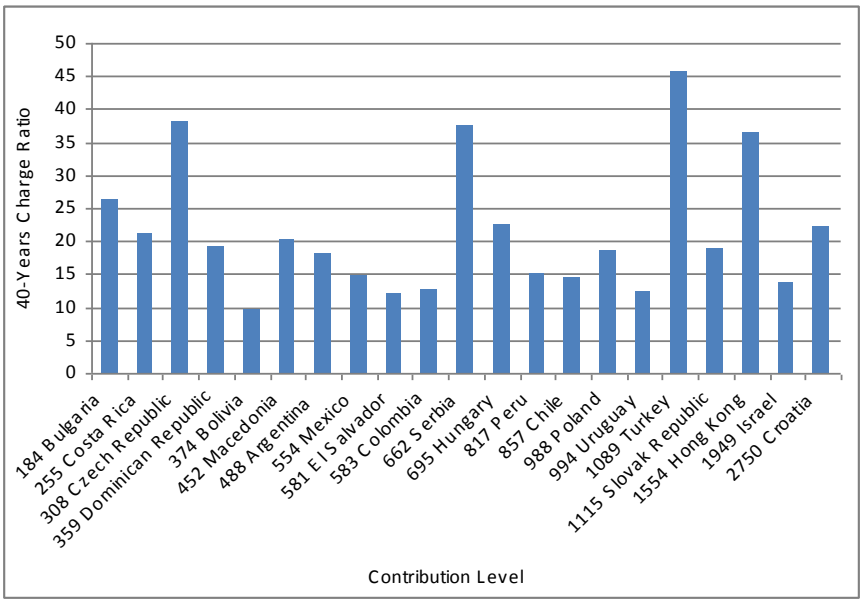


Figure 22 shows the average monthly wage per each of the countries under analysis and Figure 23 shows the average annual contribution made into the pension fund per country in U.S. Dollars. This last Figure is the result of combining the average wage and the percentage of wage contributed into a pension fund. The highest average monthly salary is found in Israel with $1,412 U.S. Dollars, and the smallest in Bulgaria with $306 U.S. Dollars. The gap between these two amounts is more than a thousand dollars per month, which is a large difference, see Figure 22.

Comparing the three voluntary systems under analysis in Figure 23, i.e. Czech Republic, Serbia and Turkey; Czech Republic holds the largest wage level and the smallest percentage of contribution giving a small value of the annual contribution (i.e. 308 U.S. Dollars), whereas Serbia holds the smallest wage level and more than double of the annual contribution (i.e. 662 U.S. Dollars).

ii. Assumptions – sensitivity analysis

Sensitivity analysis was undertaken in relation to various assumptions used in the model. First, the rate of return on investments was changed from the assumed 5% to 2% and then to 8%. This did not affect the country charge ratio rankings.

The effect of changing the contribution rate on the charge ratios per country was also investigated. When changing the percentage of contribution in the model, the values of the charge ratios per country do not change. This is because this percentage does not affect the charge ratios as this is a percentage also, then when applying our methodology the only factor affecting it is the kind of fee charged per country.

Finally, salary increases were input into the model (rather than the standard assumption of constant salaries) and the results were also not affected.

Details of the sensitivity analysis can be found in ***Appendix 2***.

VII. Conclusions

The following factors can be seen to have some explanatory force regarding the countries' charge ratios analyzed:

- Voluntary systems tend to have higher charge ratios.
- Systems where there is small number of providers, show relatively lower charge ratios.
- Charge ratios decline over time, making older pension systems in general relatively less expensive.
- Regulations, particularly those limiting asset based fees, can reduce costs in pension systems – but opportunity costs (of higher returns) may be sacrificed
- Regulations imposing minimum guarantees imply higher charge ratios
- High contribution and wage rates deliver higher final balances and therefore may deliver lower charge ratios

Explanations by country

Looking at the outlying countries, Bolivia holds the lowest charge ratio and is the only one with a charge ratio below 10%. Hong Kong, Serbia, Czech Republic and Turkey are the outliers on the higher end with charge ratios over 35%. The other countries fall within a range of around 12-27%. Attempts to explain the outlying results are provided below.

- ***Bolivia*** holds the lowest charge ratio, with only 2 pension fund managers operating, which were chosen on the basis of their asset management fee. The system in Bolivia was deliberate set up to be low cost. Both charge the same comparatively low fees on flows and assets under management. This is one of the few countries in Latin America which does not charge death and disability insurance (the others being Costa Rica, Dominican Republic and Mexico). Regulations and controls are also strict in Bolivia, keeping costs low compared with other countries. However, because of the low average wages in Bolivia, the final balance in the individual account is not large. The Chłoń-Domińczak report on costs of pension funds[12], states that one of possible explanations of such low cost may be in the asset allocation of Bolivian funds, which invest most of their assets (more than 90%) in domestic treasury bonds (questionnaire information).
- ***Costa Rica*** holds the highest charge ratio of all LA countries. This is due to the high charges on returns, i.e. 7.50% of assets under management. Costa Rica charges fees on nominal and real returns, the average fee on nominal returns is 7.50%, whereas the average fee on real returns is 15.38%. This kind of fee on returns is one that most affects the final balance on the pension fund. That is the reason for Costa Rica holding the third lowest final balances. Costa Rica and Poland are the only countries charging this kind of fee, however, in Poland this fee is as low as 0.03%.
- ***Israel*** holds the lowest charge ratio from its group and also from all CEE countries. Moreover, Israel holds a lower charge ratio than some of the LA countries. The relatively low charge ratio in Israel is at least partly driven by the low charge on assets under management and by the high average contribution made to the fund,

[12] Chłoń-Domińczak, et. al, "Costs and charges of pension funds. International comparison and methods of approximation" in Institute for Structural Research, Warsaw, Poland - *paper under revision and due for publication in 2008/9*

which is the second highest. That is the reason for Israel having the second highest final balances of the pension fund.

- ***Poland*** holds the lowest charge ratio of all CEE countries. This is at least partly driven by the high average wage per worker and the relatively high percentage of contribution into the individual's account delivering a high final balance. Added to these factors, the fees charged by pension fund managers in Poland are relatively low. As noted earlier, Poland is one example where costs declined sharply in the first few years of the systems' operation. In addition, there was a substantial rule change relating to open pension funds in 2004, whereby the fee on contributions was unified and capped (and as a result they fell from 6.12% in 2004 to 5.83% in 2005).

- ***Bulgaria*** the comparatively high charge ratio in Bulgaria stems largely from the extremely low final balance, driven both by the lowest average wage used in calculations and a low contribution ratio. Bulgaria's pension fund managers charge fees on flows and on assets under management and this country holds one of the highest charge on flows from all CEE countries under analysis (i.e. 5.0%) and the third highest charge on assets under management (i.e. 1%). We note from all other countries under analysis, that when the charge on flows is a high value, either there is no charge on assets under management (as in the majority of LA countries), or this fee is relatively low (as in the majority of CEE countries). This is one of the countries where both charge fees are a high value.

- ***Hong Kong*** also appears to have a comparatively high charge ratio. There may be in part, methodological explanations as to why the Hong Kong figure is relatively higher. Firstly, the expense ratio figures used in calculating the Hong Kong figure incorporates the fees of any underlying investment structure, which is not necessarily the case for other systems. In the absence of this uplift, the Hong Kong figure would be substantially lower. Another factor to consider is that in Hong Kong the service providers often rebate an amount of fees back to individual members (for example as a way of reducing the effective level of fees to employees of larger employers). Such a rebate (which in effect lowers the total fee impact) is not reflected in the calculated figure. It is not possible to quantify the overall impact, but the effect on individuals may be to reduce fees by up to 0.5% per annum. In addition, over 5% of Hong Kong's fee figure represents guarantee fees, i.e. the amount paid to a guarantor to provide the guarantee in guaranteed funds. As noted earlier in the paper, the model adopted in this paper also tends to overstate the long-term impact of those systems, like Hong Kong, using asset based fees. The privately managed and fully funded contribution system in Hong Kong is also relatively new, having been launched in 2000. Another difference in Hong Kong is that individuals are offered a broad range of investment options and the potential to derive higher returns than in the more restricted Latin American and Eastern European systems.

- ***Serbia*** the high charge ratio in Serbia is mainly due to the high charges on flows and assets under management paid by the member. This is one of the three voluntary pension systems analysed in this report and from the results this fact suggests that voluntary systems are comparatively higher than the mandatory ones. The fee on assets under management is the second highest fee of all CEE countries (i.e. 1.78%). Although, legislation in Serbia sets limits on these fees, the actual fee charged on assets under management is quite close to the maximum limit and the charges on flows are also close to it. Other explanations for the high charge ratio include the low contribution rate into these voluntary funds. However, it should be noted that the percentage of contribution (i.e. 6.3%) is not as low as other voluntary systems, such as the Czech Republic. This low contribution and the high fees in Serbia makes this to have one of the lowest final balances on the member's account (i.e. less than $52,000) and one of the highest charge ratios. It should also be noted that Serbia's is

the youngest system analysed, being set up only last year and therefore, charges may be expected to decline over time.

- ***Czech Republic*** the comparatively high charge ratio in the Czech Republic is due to this is a voluntary pension system. This is likely to affect the willingness of individuals to save for retirement and could explain the low average contribution rate (i.e. 2.32% of average wage), which generates a very low final balance (which in turn leads to a high charge ratio). As with the other voluntary systems, the charge on assets under management is relatively high (1.92%), though, as with Hong Kong, this is an estimated rather than actual charge. No direct fees can be charged by pension funds in the Czech Republic. Instead participants are in the role of creditors for the pension fund and instead of fees they share jointly on all expenses and returns. In order to compare the data for the Czech Republic, an Expense Ratio derived from our calculations is used, based on expenses and assets under management per pension fund manager. This is assumed to be the fee on assets under management. The charge ratios of other countries may not be inclusive of all expenses incurred by a fund in addition to fees and charges. The methodological issue of the model tending to overstate the costs of systems which rely on assets under management charges applies to the Czech Republic.

- ***Turkey*** holds the highest charge ratio from all countries under analysis. This high charge ratio in Turkey is driven by the relative highest charge on assets under management made by fund managers in the country (2.35%), which is nevertheless well below the regulated ceiling (3.65%). In addition to asset charges, a charge on flows is also used, which makes overall costs even higher. Turkey is also one of the few voluntary systems analysed, suggesting that the higher charges may involve marketing and other costs required to drive pension fund membership. This is also a relatively new pension system (set up in 2003) which suggests that charges may reduce over time.

- Charge ratios in Latin American countries are on average lower than CEE due to the low charge ratios in Bolivia, El Salvador, Uruguay and Colombia. Also, although in LA countries there are death and disability charges in some countries, these are lower. In addition, LA countries hold the highest charges on flows. However, it is noted from the results in this report, that charges on assets under management have a greater impact on charge ratios and final balances, than charges on flows. That is the reason for some LA countries to be the lowest and the voluntary systems the highest.

Appendix 1: Methodology

A. Equivalent asset fees

Equivalent asset fees and charge ratios were calculated for each pension fund manager and by country. The methodology to calculate equivalent fees is:

The equivalent asset commission is the annualized charge over assets which would have generated exactly the same final asset accumulation as the actual combination of charges on flows entering the individual account, on the accumulated assets and on the returns applied to the individual retirement account as well as any entry or exit charges applied to an individual retirement account during a certain period of time (usually the working time span of an average worker).

The first step in order to calculate an equivalent fee is to estimate the asset accumulation in the individual retirement account for an average worker in an annual basis. This is done by taking an average wage as given and calculating the flow contribution into the retirement account according to the current legislation in each country, as well as a fixed rate of return, and all of the fees that a worker entering the workforce today is expected to pay during the 25-40 year period before he retires.

The general formula used to estimate the asset accumulation in the individual retirement account in each period is the following:

(1)

$$S_f = \left[S_i * \left(1 + \frac{i'}{100}\right) * \left(1 - \frac{\beta}{100}\right) \right] + \left[\left(F_i * (1-\alpha) + cs\right) * \left(1 + \frac{i'}{100} * \frac{1}{2}\right) * \left(1 - \frac{\beta}{100} * \frac{1}{2}\right) \right] * (1-\gamma)$$

Where:

S_f = Balance in the individual retirement account at the end of period i.

S_i = Balance in the individual retirement account at the beginning of period i.

F_i = Flow contribution to the individual retirement account in period i, including all contributions from employers, employees and the government.

cs = Any fixed contribution which is not subject to charges on flows or a fixed charge on flows (in which case it would be a negative number).

α = Proportional charge on flows (as a percentage of Fi).

β = Proportional charge on assets under management.

i' = Real rate of return net of charges on returns.

γ = Proportional exit fee.

Equation of (1) determines the accumulated balance at the end of a working life for an average worker in a given country taking into consideration the fees charged by a particular pension manager which operates in that country. The annual fee on assets that would have generated exactly that end of period balance if no other fee had been charged during the worker's work life can be obtained through an iterative solving mechanism. It is essential to understand that the calculations in equation (1) are repeated 25-40 times to obtain a final balance in the individual retirement account and that the fees that are used take into consideration any programmed reductions in fees either due to already set chronological reductions in fees or those offered to workers according to the number of years in the system.

Equation (2) is used to determine the equivalent asset commission which would generate an end-of-period balance identical to that obtained using all of the fees expected to be charged by the pension manager. The equivalent asset commission is a percentage Ψ, given by:

(2)

$$\left[S_i * \left(1+\frac{i}{100}\right) * \left(1-\frac{\psi}{100}\right)\right] + \left[\left(F_i + cs\right) * \left(1+\frac{i}{100} * \frac{1}{2}\right) * \left(1-\frac{\psi}{100} * \frac{1}{2}\right)\right] = S_f$$

Where:

Ψ = is the proportional charge on assets under management that makes the r.h.s. of (2) equal the final asset balance S_f obtained by using equation (1).

B. Charge ratio

The charge ratio is an indicator of the administrative cost fees charged on individual retirement accounts which has proven to be particularly useful in international cost comparisons. The charge ratio measures the impact that any type of administrative charge can have on the final balance (after 25 or 40 years) of an individual retirement account compared to the hypothetical balance that could be obtained if no administrative fees were charged at all. This measure has been used to compare administrative charges in Latin America and in other countries with privately managed retirement savings accounts.[13]

(3)

$$Charge\ ratio = \frac{S_f\Big|_{No\ Commissions} - S_f\Big|_{With\ Commissions}}{S_f\Big|_{No\ Commissions}}$$

It is important to note that the equivalent asset commission and the charge ratio generate exactly the same ordering of managers from cheapest to most expensive. This is because both indicators begin by taking into consideration the final asset balance expected to be accumulated in an individual retirement account. The equivalent asset commission then calculates the asset fee that would generate that balance in absence of any other fees. The charge ratio, in contrast, compares the asset balance expected to be accumulated with the balance that would be obtained in a hypothetical no-fee scenario.

[13] See Whitehouse, E.R. (2001), "Administrative Charges for Funded Pensions: Comparison and Assessment of 13 Countries", in OECD, Private Pension Systems: Administrative Costs and Reforms, Private Pensions Series, Paris.

C. Exchange rates used in calculations

Country [a)]	Currency Code	1 USD
Bulgaria	BGN	1.38
Croatia	HRK	5.41
Czech Republic	CZK	19.39
Hong Kong	HK	7.80
Israel	NIS	3.90
Macedonia	MKD	38.53
Poland	PLN	2.53
Serbia	RSD	51.46
Slovak Republic	SK	20.712
Turkey	YTL	1.2124

a) The Latin American Countries are not included in this Table, as the results were provided by CONSAR. No calculations were made for these countries.

Appendix 2: Sensitivity Analysis

Rates of return

A sensitivity analysis on the rate of return has been performed in this Section, in order to investigate whether or not our assumptions for the rate of return affect the results on charge ratios. For the results shown previously in ***Section V***, we assumed a value of 5% for the rate of return of the pension fund performance. We have varied the value of this rate of return and in Table 6 we show the weighted charge ratio for three different values (i.e. 2%, 5% and 8%) and for all the CEE and other countries analysed.

Table 6: Charge Ratios for different values of the rates of return

	Charge Ratios 40 years		
	2%	5%	8%
Israel	12.43%	13.67%	14.65%
Poland	17.23%	18.74%	19.93%
Slovak Rep	17.25%	19.03%	20.85%
Macedonia	18.51%	20.24%	21.61%
Croatia	19.47%	22.21%	24.37%
Hungary	20.46%	22.57%	24.50%
Bulgaria	23.81%	26.51%	28.64%
Hong Kong	32.09%	36.42%	39.79%
Serbia	33.28%	37.51%	40.80%
Czech Rep	33.66%	38.14%	41.62%
Turkey	41.08%	45.88%	49.58%

Table 6 shows that regardless the value of the rate of return assumed; the ranking for the charge ratio per country is the same. Then, Israel also holds the lowest charge ratio and Turkey the highest. We also note from Table 6 that as we increase the value of the rates of return (i.e. along the columns in the Table), the values for charge ratio also increase. This is because the difference between the final balance when commission is not charged and the final balance when commission is fully charged becomes higher as we obtain higher returns on the fund, making this the charge ratio higher.

Figure 24: Sensitivity analysis for different rates of return and 40 years of projection

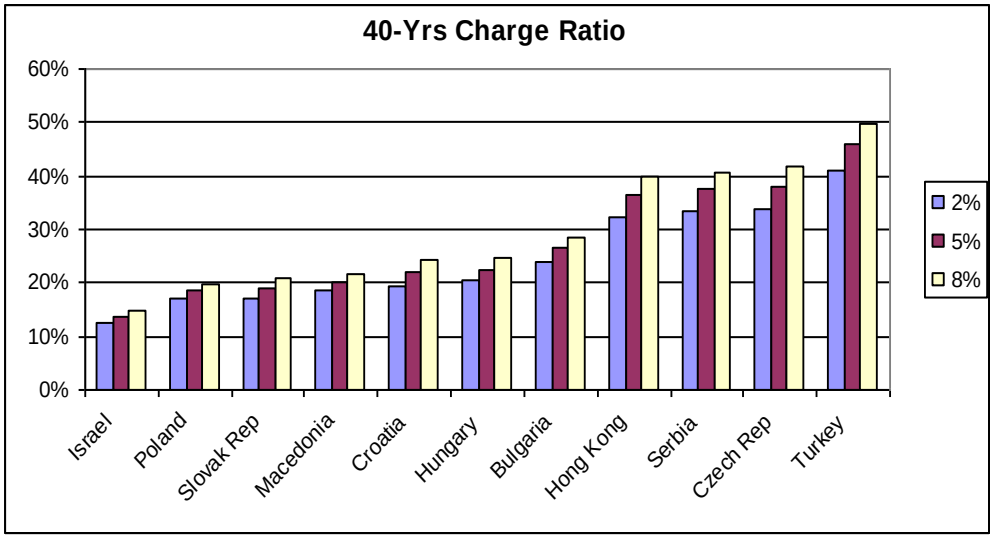


Figure 24 shows that the charged fees in Turkey are around 20% higher than in Israel, when 2% of the rate of return is assumed, which is a high difference. The corresponding difference when 5% is assumed is 30%. When 8% is assumed, the difference is 35%.

In conclusion, our assumption on the rates of return does not affect the ranking on the results in our calculations shown in this report. That is, regardless the assumption made on the rate of return, Israel holds the smallest charge ratio and Turkey the highest for all CEE and the group of other countries analysed.

The effects on changing the rate of return in our model are also investigated for LA countries. These results are provided by CONSAR and are shown in Tables 7 and 8.

Table 7: Equivalent fees for different values of the rates of return

40-yrs Weighted Average Equivalent Fees

	Rate of Return		
	3%	**5%**	**7%**
Argentina	0.85%	0.77%	0.72%
Bolivia	0.41%	0.39%	0.38%
Chile	0.67%	0.61%	0.57%
Colombia	0.58%	0.53%	0.49%
Costa Rica	0.77%	0.92%	1.07%
Dominican Rep	0.86%	0.84%	0.82%
El Salvador	0.54%	0.49%	0.46%
México	0.61%	0.62%	0.64%
Perú	0.69%	0.63%	0.58%
Uruguay	0.56%	0.51%	0.48%

Table 8: Charge Ratios for different values of the rates of return

40-yrs Weighted Average Equivalent Fees Ranking

	Rate of Return		
	3%	**5%**	**7%**
Argentina	9	8	8
Bolivia	1	1	1
Chile	6	5	5
Colombia	4	4	4
Costa Rica	8	10	10
Dominican Rep	10	9	9
El Salvador	2	2	2
México	5	6	7
Perú	7	7	6
Uruguay	3	3	3

Tables 7 and 8, show the equivalent fees for different values of the rates of return, i.e. 3%, 5% and 7%. These suggest that regardless the assumption on the rates of return, the ranking on equivalent fees is consistent (with minimum changes). Then, the assumption on rates of return does not affect the results on equivalent fees for LA countries. This is also consistent with the results for CEE and other countries. Note that the sensitivity analysis in Latin American Countries is made with equivalent fees rather than charge ratios as in CEE Countries.

Salary increases

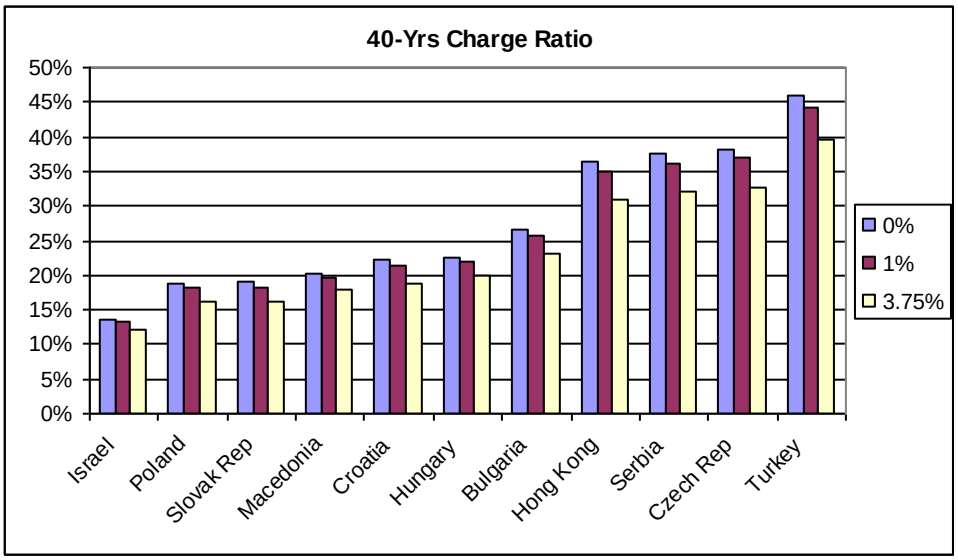
The effect on changing our assumption on the salary in our model is also investigated. In our results for charge ratios per country for CEE and Asian countries, we assumed a constant salary throughout the whole period of projection. When we change this assumption by an increase on salaries per year, we found no evidence that this assumption affects our results. That is, when assuming a percentage of increase on salary, the ranking per country based on charge ratios, does not change. Table 9 gives the results of charge ratios per country, when we assume two different percentages of increase on the salary, i.e. 1% and 3.75%. The choice of 1% is made to be able to compare our results on CEE Countries with the ones provided by CONSAR on LA Countries and the choice of 3.75% is assumed to be equal to the common use in practice of 1.75% of productivity plus 2.5% of inflation.

Table 9: Charge Ratios when salary increases occur

	Charge Ratio - 40 yrs		
	0%	1%	3.75%
Israel	13.67%	13.26%	12.07%
Poland	18.74%	18.20%	16.08%
Slovak Rep	19.03%	18.29%	16.06%
Macedonia	20.24%	19.68%	18.00%
Croatia	22.21%	21.32%	18.68%
Hungary	22.57%	21.99%	19.80%
Bulgaria	26.51%	25.64%	23.02%
Hong Kong	36.42%	35.02%	30.81%
Serbia	37.51%	36.15%	32.03%
Czech Rep	38.14%	36.94%	32.54%
Turkey	45.88%	44.34%	39.65%

The results in Table 9 show that although we increase the salary by a percentage through the time, Israel holds the smallest charge ratio and Turkey the highest for all the scenarios. That is, regardless our assumption on increases on salary per country (i.e. 0%, 1% or 3.75% per year), our results are the same when comparing rankings based on charge ratios per country, see Figure 25. Note that the results shown in ***Section V***, assumed 0% on increases on salaries.

Figure 25: Sensitivity analysis for different salary increases



The effect of increases on salaries over charge ratios in LA countries is also investigated. Table 10 and 11 show the results for equivalent fees provided by CONSAR. This is the sensitivity analysis performed for LA countries. Contrary to CEE and Asian, where charge ratios are compared.

Table 10: Equivalent fees when salary increases occur

40-Yrs Weighted Average Equivalent Fee

	0%	1%
Argentina	0.77%	0.81%
Bolivia	0.39%	0.40%
Chile	0.61%	0.64%
Colombia	0.53%	0.55%
Costa Rica	0.92%	0.93%
Dominican Rep	0.84%	0.85%
El Salvador	0.49%	0.52%
México	0.62%	0.62%
Perú	0.63%	0.66%
Uruguay	0.51%	0.54%

Table 11: Ranking of equivalent fees when salary increases occur

40-Yrs Weighted Average Equivalent Fee Ranking		
	0%	**1%**
Argentina	8	8
Bolivia	1	1
Chile	5	6
Colombia	4	4
Costa Rica	10	10
Dominican Rep	9	9
El Salvador	2	2
México	6	5
Perú	7	7
Uruguay	3	3

Table 10 shows the values for equivalent fees when no increase on salary is assumed (i.e. 0%), and when an increase of 1% on salaries is assumed. Table 11 shows the ranking of these equivalent fees per country. The results show that regardless the assumption on salary increases, the ranking on equivalent fees remains the same (we note a minimum change between Chile and Mexico which switch places). Then, the assumption on salary increases does not affect our results on equivalent fees for LA countries.