

Social Worker Loan Repayment Program Evaluation: Presentation of Findings

Presented to the
DC Child and Family Services Agency

September 17, 2008
(Revised September 22, 2008)

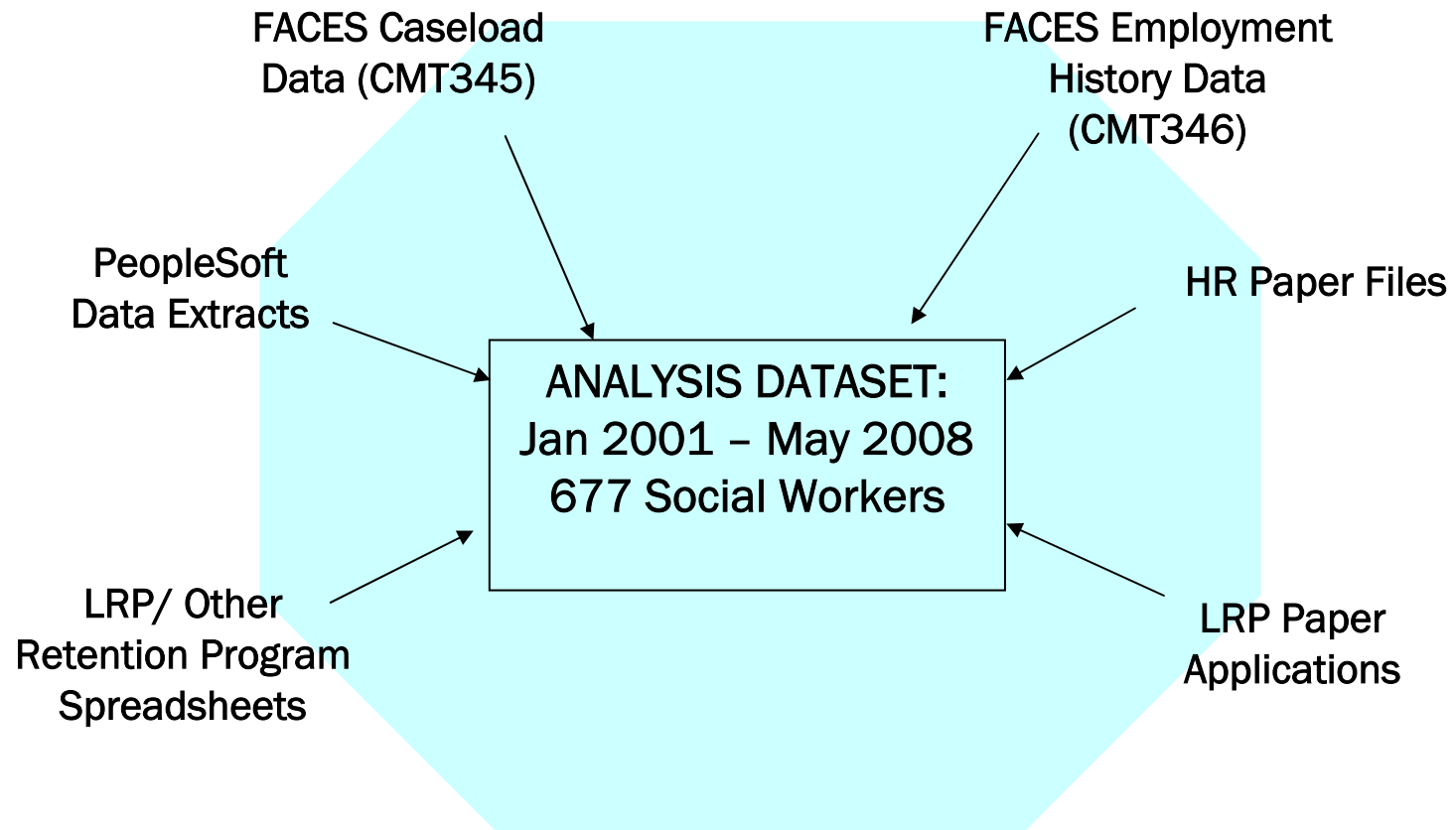
Presented by:
Kairos Management

Presentation Overview

- I. Review data collection and analysis methods
- II. Overview of LRP and other retention programs
- III. Analysis of social worker employment dynamics
- IV. Statistical modeling of the impact of LRP
- V. Program costs and benefits

I. Data Collection and Analysis Methods

Kairos Management: CFSA Social Worker Loan Repayment Evaluation Analysis Database



Data Collection

- Analysis examined all 677 persons who at any point in time between Jan 2001 and May 2008:
 - Had a position title in of Social Worker, Social Work Associate, or Social Worker Trainee
 - Had at least one case assigned in FACES
 - Was working in a program area that includes case-carrying social workers
- Social Worker employment histories were constructed as follows:
 - FACES data were extracted to determine all persons who met the above criteria
 - FACES work history data were cleaned, analyzed, and merged into a single analysis database
 - The evaluation team reviewed the paper HR files of all social workers to confirm or correct work history data, using primarily form SF50
 - Additional data such as age, education history, health insurance, marital status was obtained from information found in the files

Data Collection (continued)

- Data on LRP and other retention programs were collected from spreadsheets and paper files:
 - Data from LRP paper files was entered into the analysis database
 - Spreadsheets provided to us by HR on LRP and other retention programs (Additional Income Agreements, Hiring/Bi-lingual Bonus, Relocation Expense Reimbursement) was reviewed and entered into the analysis database
 - Any information in HR files on retention programs not captured above was also entered into the analysis database
 - Financial data on payments made was obtained from paper files from Fiscal and spreadsheets from HR
- Data were read into statistical analysis software for analysis:
 - Social Worker histories were converted into monthly longitudinal data for basic tabulations
 - Data were also converted into survival time format for statistical analysis using survival analysis methods

Defining Case-Carrying Social Worker Retention

- Social workers can stop being case-carrying social workers due to:
 - Voluntary resignation
 - Transitioning to another position or program area within CFSA
 - Being terminated (including during probationary period)
- Social workers are considered “new” case-carrying social workers due to:
 - Beginning employment with CFSA
 - Transitioning to a case-carrying social worker position within CFSA

The Key Question:

Did the Loan Repayment Program improve social worker retention? If so, by how much?

The Key Problem:

“Selection bias”: How do we know that the LRP caused the improvement in social worker retention? Maybe people who enrolled in LRP would have stayed with CFSA anyway.

Selection Bias

Selection bias is a statistical analysis problem that can distort the results if not accounted for.

In this case the problem is “self-selection bias”. Social workers themselves decided whether or not to enroll in LRP. If those who enroll are different from those who do not enroll in ways that we cannot observe/measure AND that impact retention, the analysis may be flawed.

For example, perhaps social workers who enrolled in LRP (as compared to those who did not enroll):

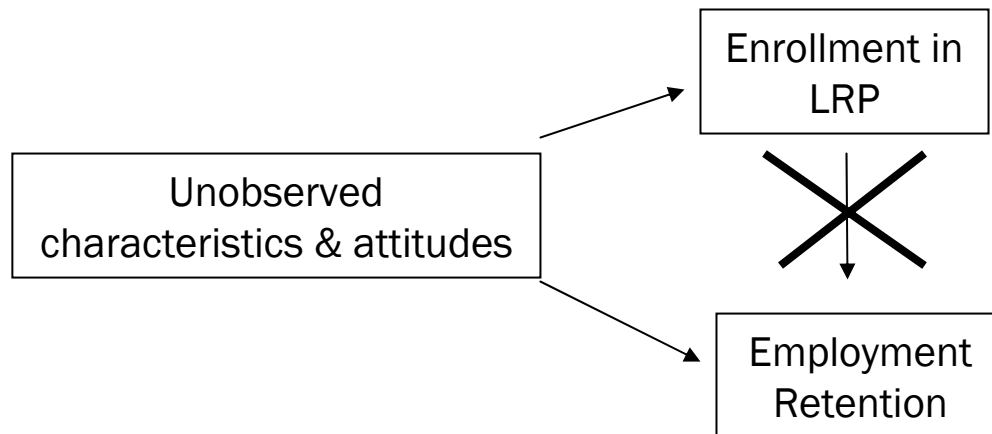
- Get along better with their co-workers
- Enjoy their job more
- Like living in the DC area
- Have a personal life that accommodates for the hours/challenges of social work

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Selection Bias (continued)

We observe:

Enrollment in LRP → Employment retention

But in fact, the true dynamic is:



Selection Bias (continued)

How do we deal with the selection bias problem?

1. Construct comparison group(s) in a way that minimizes selection bias and/or allows us to measure it
2. Consider in theory how large a problem selection bias might be – how bad do we think the problem really is?

II. Overview of the LRP and Other Employment Retention Programs

Kairos Management: CFSA Social Worker Loan Repayment Evaluation

Retention Programs

Which programs did we include in our analysis?

- LRP (obviously)
- Hiring and Bilingual Bonus
- Relocation Bonus
- Additional Income Agreement

Including these additional programs was critical because they impact retention. They require a commitment to remaining employed with CFSA.

Kairos Management: CFSA Social Worker Loan Repayment Evaluation

Program name	Summary	Who is eligible	Length of agreement	Payment amount	Consequence for voluntary termination
Student Loan Repayment Program	Provides repayment of student loans (up to \$10,000 - \$18,000) directly to the loan company on employee's behalf with agreement to work 2-4 years.	Social workers who are case-carrying and have verified student loan debt	2 years, or the time it would take to have 4 total years of tenure at CFSA as case-carrying social worker	If less than 5 years tenure: \$15,000 for MSW and \$10,000 for BSW If more than 5 years tenure: \$18,000 for MSW and \$13,000 for BSW Not to exceed amount of actual student loan debt	Full repayment of any payments made to loan company on employees behalf
Additional Income Allowance	Provides an increase in pay if employee agrees to work for an additional 1 or 2 years	Workers employed with CFSA for at least one year, excluding those under an active Hiring Bonus service agreement	1 or 2 years (2-year agreements result in higher additional income amounts)	Varies from \$80 per pay period (\$2,080 annually) to \$175 per pay period (\$4,550 annually) based on length of tenure at CFSA, LGSW/LICSW ¹ status, and length of agreement ²	Full repayment of additional income actually received
Hiring Bonus	Provides a one-time payment for new employees	Workers employed with CFSA for at least 90 but less than 120 days, excluding any former CFSA employees who left within the prior 3 years	1 year ³	\$1,500 for LICSW/Social Workers \$1,000 for LICSW/Social Workers \$800 for Social Work Associates with 1-year agreements; \$1,300 for Social Work Associates with 2-year agreements	Full repayment

¹ LGSW is Licensed Graduate Social Worker. LICSW is Licensed Independent Clinical Social Worker.

² Supervisory Social Workers are eligible for up to \$250 per pay period (\$6,500 annually). However this table describes only retention programs for non-supervisory case-carrying social workers.

³ For Social Work Associates only, there may be a 2-year agreement which is for a higher amount.

Kairos Management: CFSA Social Worker Loan Repayment Evaluation

Program name	Summary	Who is eligible	Length of agreement	Payment amount	Consequence for voluntary termination
Bi-Lingual Bonus	Provides a one-time payment for new employees who are bi-lingual ⁴	Workers employed with CFSA for at least 90 but less than 120 days, excluding any former CFSA employees who left within the prior 3 years	1 year ⁵	\$1,500 for LICSW/Social Workers \$1,000 for LICSW/Social Workers \$800 for Social Work Associates with 1-year agreements; \$1,300 for Social Work Associates with 2-year agreements	Full repayment
Reimbursement for Relocation Expenses	Reimbursement of relocation expenses from areas outside the Greater Washington Metropolitan Area	Workers employed with CFSA for at least 90 but less than 120 days	1 year	Relocation expenses incurred up to \$3,000	Full repayment
Reimbursement for Social Work Licensure Fee *	Reimbursement of the cost of first time social worker licenses to social workers and social work associates	Workers who obtain first-time social worker licenses within one month of being hired or within three months prior to being hired	1 year	Amount of licensure fee (generally \$176)	Full repayment

* Not included in our analysis because the relatively small payment amount.

⁴ The official policy applies to “bilingual and/or bicultural Spanish and English speaking or speak any other language for which the Agency has a defined need.”

⁵ For Social Work Associates only, there may be a 2-year agreement which is for a higher amount.

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Persons Enrolled in LRP and Total Amount of Anticipated Loan Repayments in LRP Agreements

	Persons	Anticipated Repayments*
Round 1 (2004)	136	\$ 2.107 million
Round 2 (2006)	22	\$ 0.329 million
Total	158	\$ 2.437 million

* This is the total amount that would have been paid if all Social Workers enrolled in LRP had fulfilled their LRP agreements. Because some left prior to the time commitment, the actual amount paid is less.

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Amount of Total Loan Repayment for Social Workers

	Total	Round 1 (2004)	Round 2 (2006)
	N=158	N=136	N=22
Up to \$9,999	5.8%	6.7%	--
\$10,000	6.4%	7.5%	--
\$10,001 - \$14,999	3.8%	3.7%	4.5%
\$15,000	69.2%	64.9%	95.5%
\$15,001 - \$17,999	1.3%	1.5%	--
\$18,000	13.5%	15.7%	--

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Duration of Employment when LRP Contract Began

	Total	Round 1 (2004)	Round 2 (2006)
	N=158	N=136	N=22
<1 year	26.8 %	26.5 %	28.6 %
1 year	22.3 %	21.3 %	28.5 %
2 years	15.3 %	16.2 %	9.5 %
3 years	8.3 %	7.4 %	14.3 %
4 years	8.3 %	8.1 %	--
5 years	3.2 %	3.7 %	9.5 %
6 or more years	15.9 %	16.9 %	9.5 %

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Duration of LRP Contract

	Total	Round 1	Round 2
	N=158	N=136	N=22
24 months	48.7%	49.3%	45.5%
25 - 36 months	24.7%	20.6%	50.0%
37 - 49 months	26.6%	30.1%	4.5%

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Comparison of Characteristics of Social Workers who Enrolled in LRP
to Those Who Declined to Enroll

	Round 1 (2004)		Round 2 (2006)	
	LRP	Declined	LRP	Declined
N	136	154	22	73
Mean age	35.3	38.8 * *	36.9	42.0 * *
< 25 yrs	2.9%	3.3%	5.3%	0.0%
25-34 yrs	52.2%	38.7%	52.6%	32.9%
35-44 yrs	25.7%	29.3%	26.3%	29.0%
45-54 yrs	16.9%	16.7%	5.3%	23.7%
55-64 yrs	1.5%	9.3%	5.3%	11.9%
65+ yrs	0.7%	2.7%	5.3%	2.6%
Years since degree	4.3	7.6 * * *	5.6	10.1 * * *
<1 yr	9.6%	5.0%	0.0%	0.0%
1 yr	13.6%	9.4%	0.0%	0.0%
2 yrs	16.8%	15.1%	18.2%	5.8%
3 yrs	8.0%	10.8%	4.6%	7.3%
4 yrs	11.2%	5.8%	27.3%	14.5%
5 yrs	11.2%	6.5%	18.2%	7.3%
6+ yrs	29.6%	47.5%	31.8%	65.3%
Years as CFSA CCSW	2.9	2.5	2.6	4.4 * * *
<1 yr	26.5%	29.9%	28.6%	0.0%
1 yr	21.3%	26.0%	28.6%	8.7%
2 yrs	16.2%	15.6%	9.5%	27.5%
3 yrs	7.4%	7.8%	14.3%	21.7%
4 yrs	8.1%	9.1%	9.5%	13.0%
5 yrs	3.7%	2.6%	0.0%	8.7%
6+ yrs	16.9%	9.1%	9.5%	20.3%
Has masters degree	96.3%	91.1% *	95.5%	91.6%
Is male	13.2%	19.5%	22.7%	19.2%
Attended local U	66.1%	60.3%	45.5%	68.6% * *
Attended "Top 25" U	11.8%	11.4%	18.2%	8.6%
Is married	40.0%	36.3%	28.6%	45.1%
Has own HI	86.8%	79.6%	83.3%	81.8%
Has children with HI	30.6%	25.4%	25.0%	25.8%
Has dep with HI	23.1%	14.8% *	16.7%	12.1%

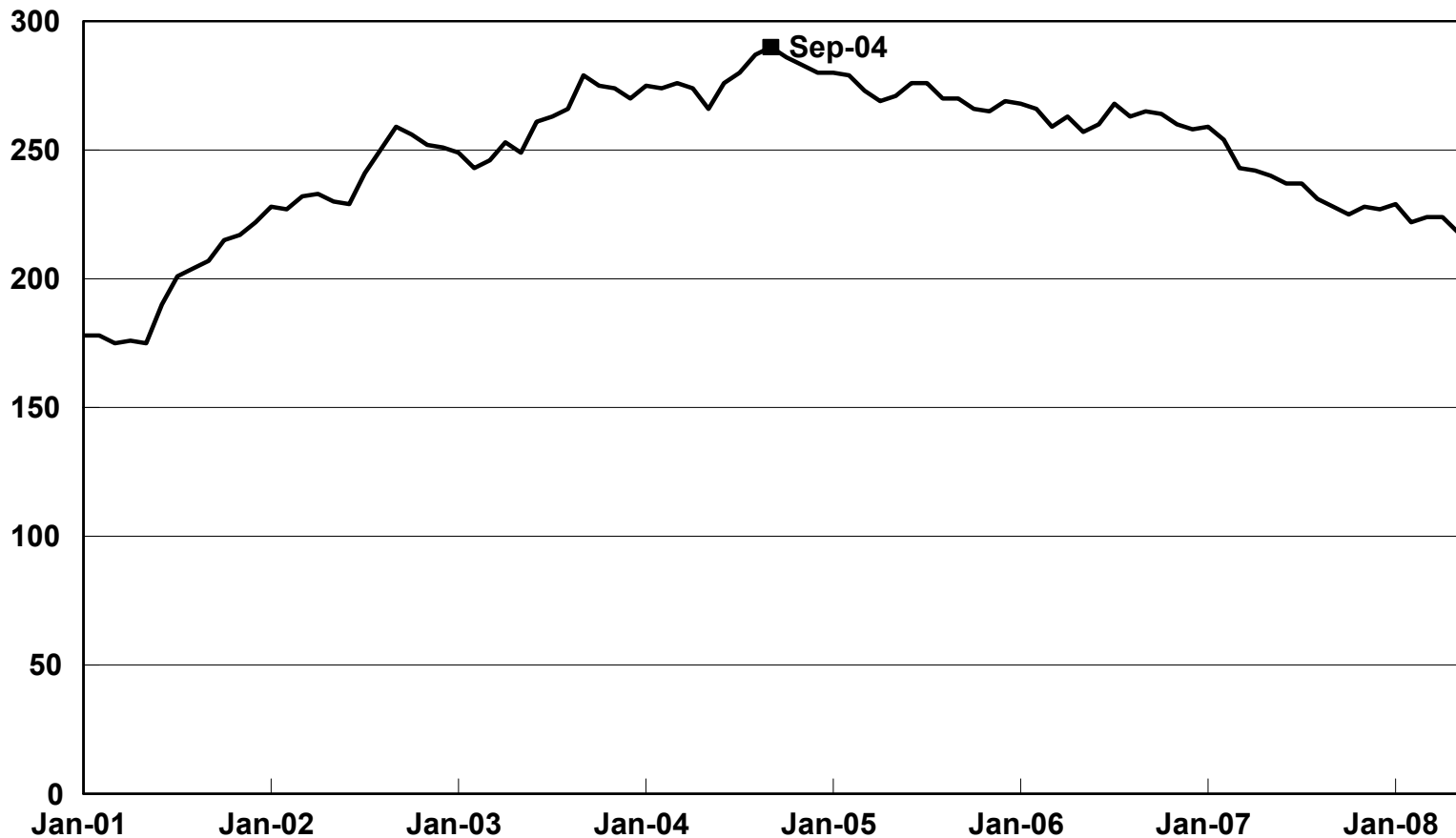
Significance level: *** .01 ** .05 * .1

Statistical significance determined by Wilcoxon-Mann-Whitney test, Fisher's exact test, or chi-square test.

III. Social Worker Employment Dynamics

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Number of Case-Carrying Social Workers, Jan 2001 – May 2008



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Number of Social Workers Leaving CFSA or
Moving to Non-Case-Carrying Status
12 Month Moving Average: Jan 2002 - May 2008



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Notes on Monthly Rates and Moving Averages

Why use 12-month moving average?

- High volatility and cyclical patterns make it difficult to discern patterns in the data – too much “noise” – a 12-month moving average smoothes the data

How big is a 1 percentage point change in the rate of social workers leaving CFSA (or moving to non-case carrying position)?

- It's surprisingly large...
- Given a constant number of 250 social workers, if 1% leave each month that equates to 30 per year. If 2% leave each month that equates to 60 per year. If 3% leave each month that equates to 90 per year. (*i.e.*, 30 per year per percentage point)

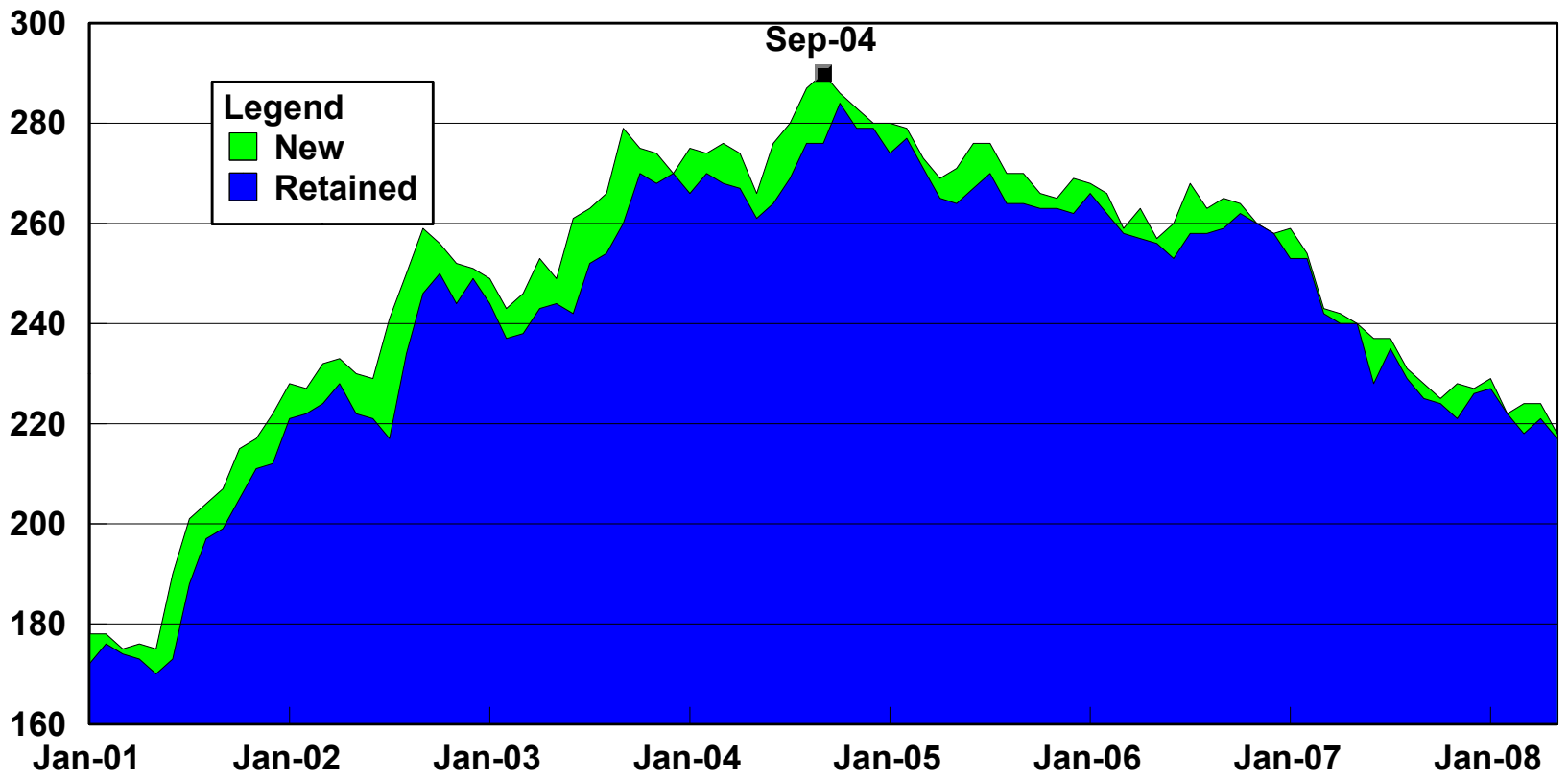
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Monthly Number of New Case-Carrying Social Workers,
12 Month Moving Average: Jan. 2002 - May 2008

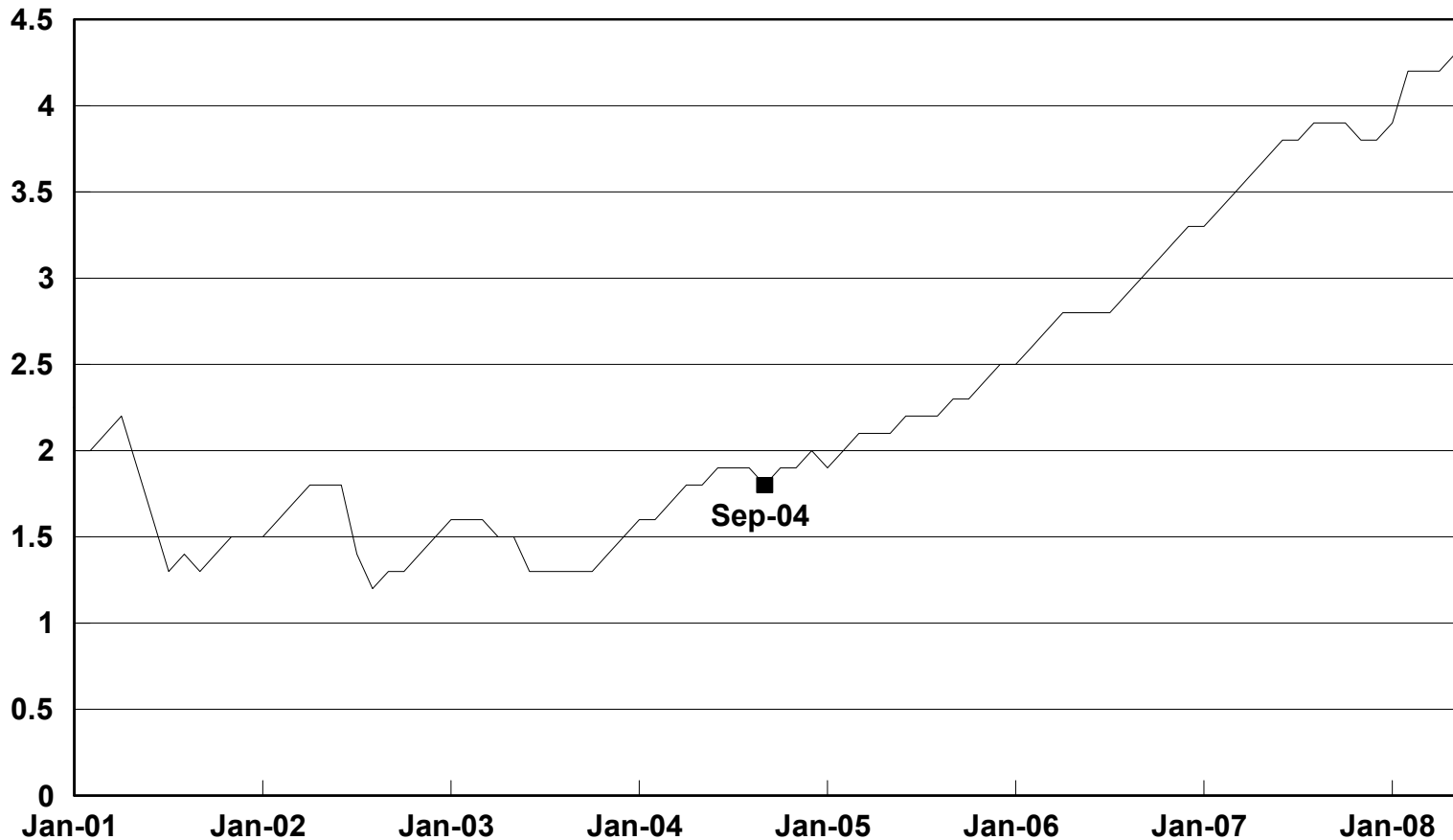


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Number of New and Retained Case-Carrying Social Workers, Jan 2001 – May 2008

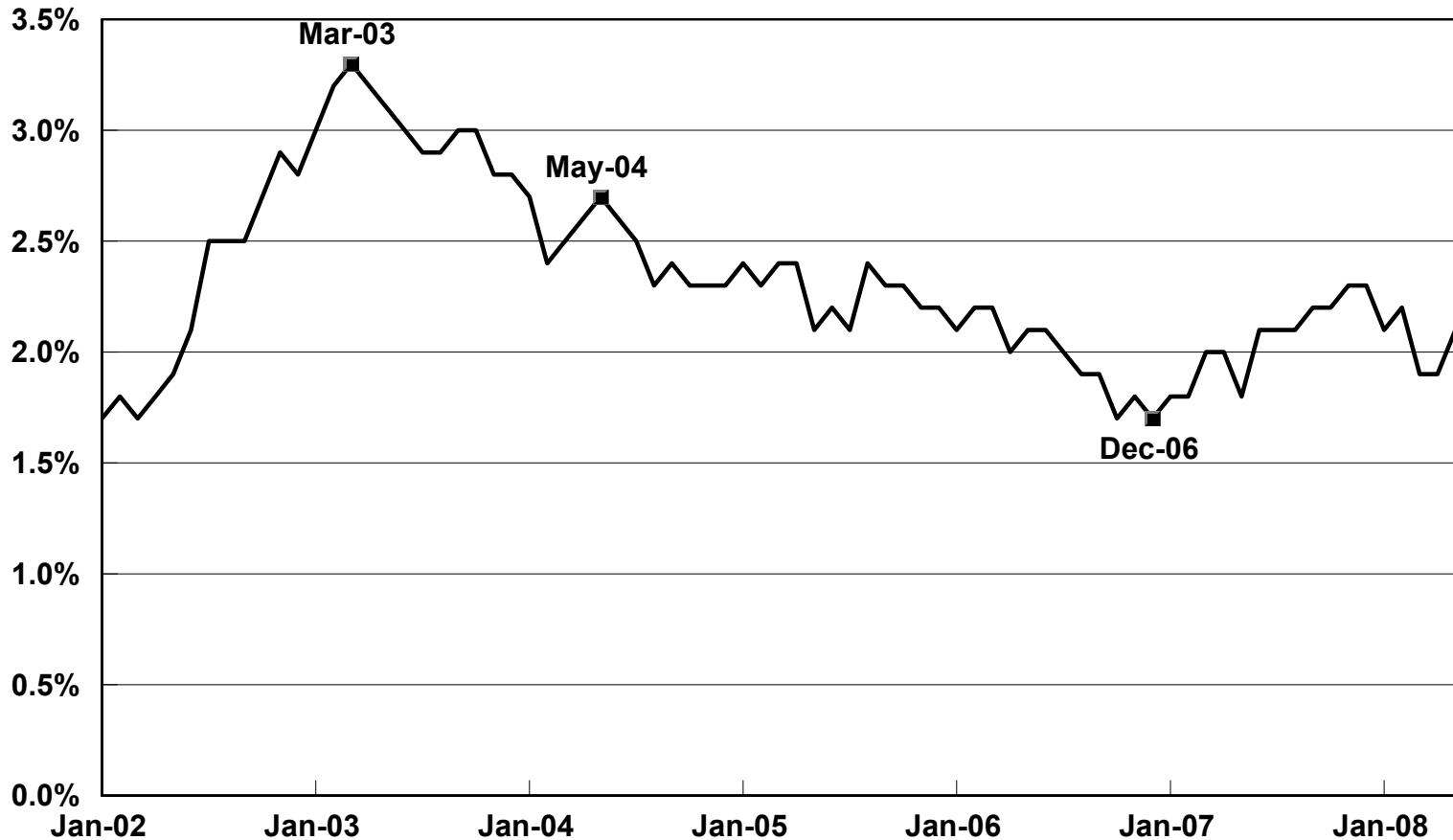


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Median Tenure (in Years) of CFSA Case Carrying Social Workers
January 2001 - May 2008

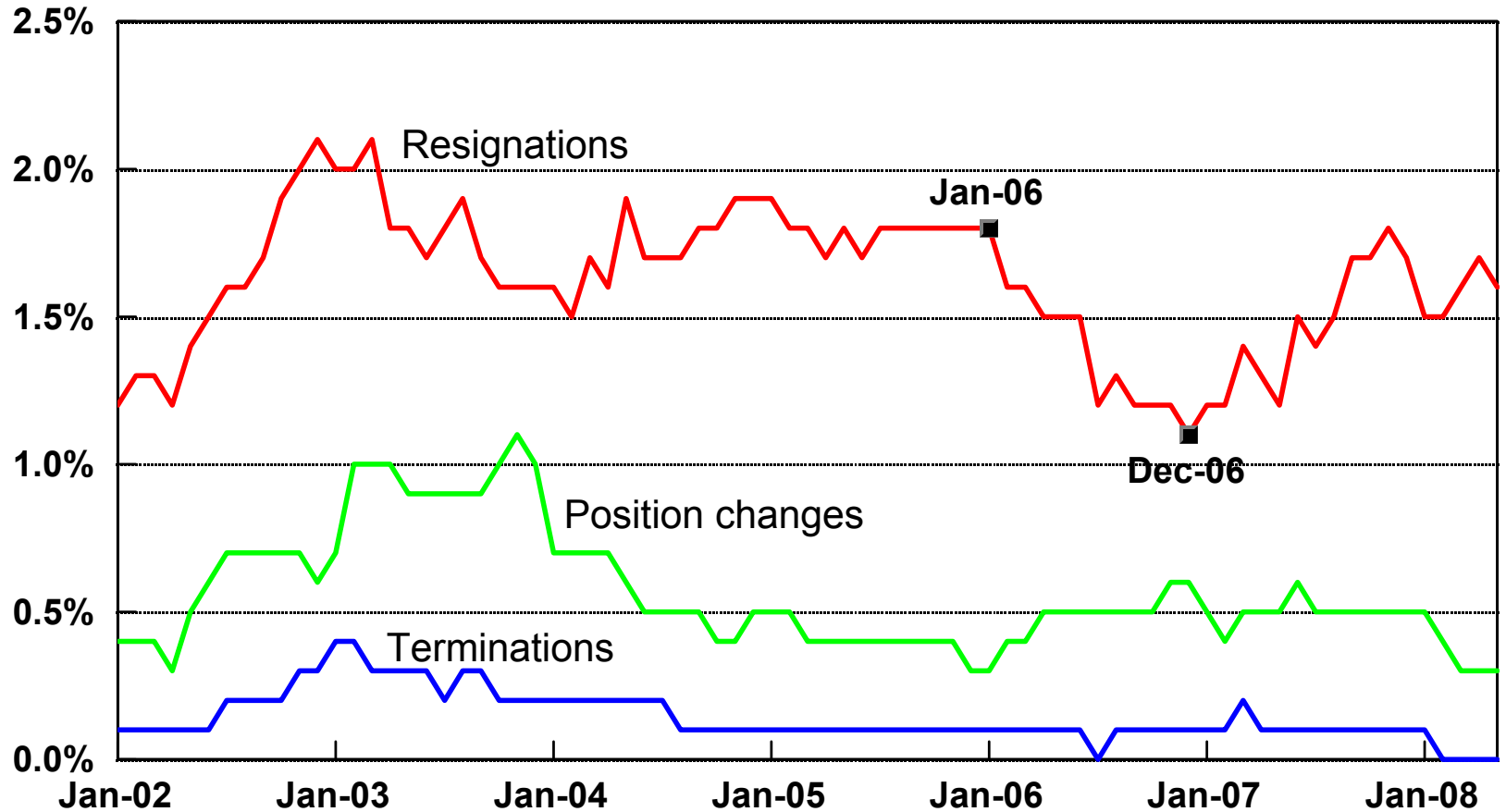


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Rate of Social Workers Leaving CFSA or
Moving to Non-Case-Carrying Status
12 Month Moving Average: Jan. 2002 - May 2008

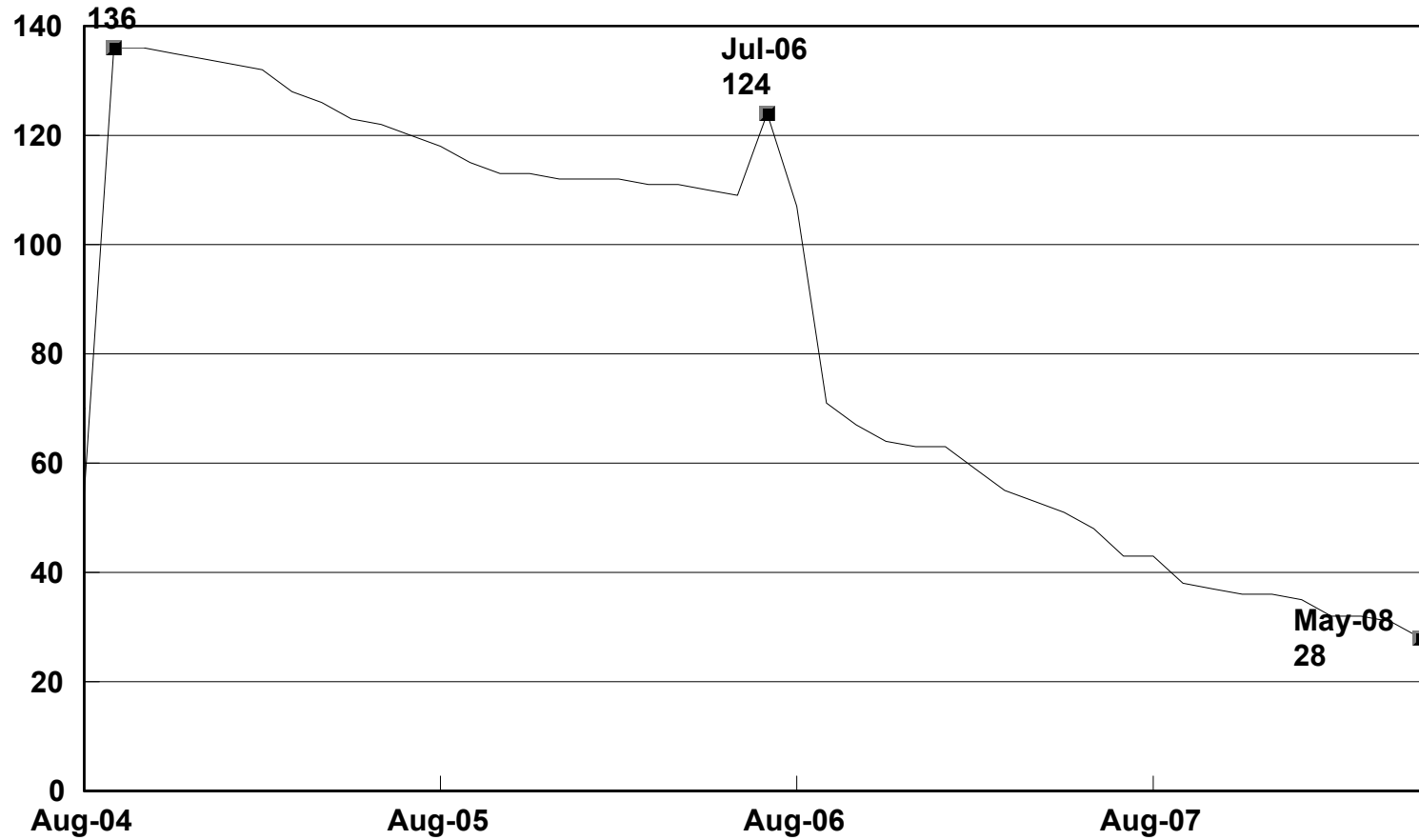


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 Rate of Resignations, Moves to Non-Case Carrying
 Positions, and Involuntary Terminations
 12 Month Moving Average: Jan. 2002 - May 2008



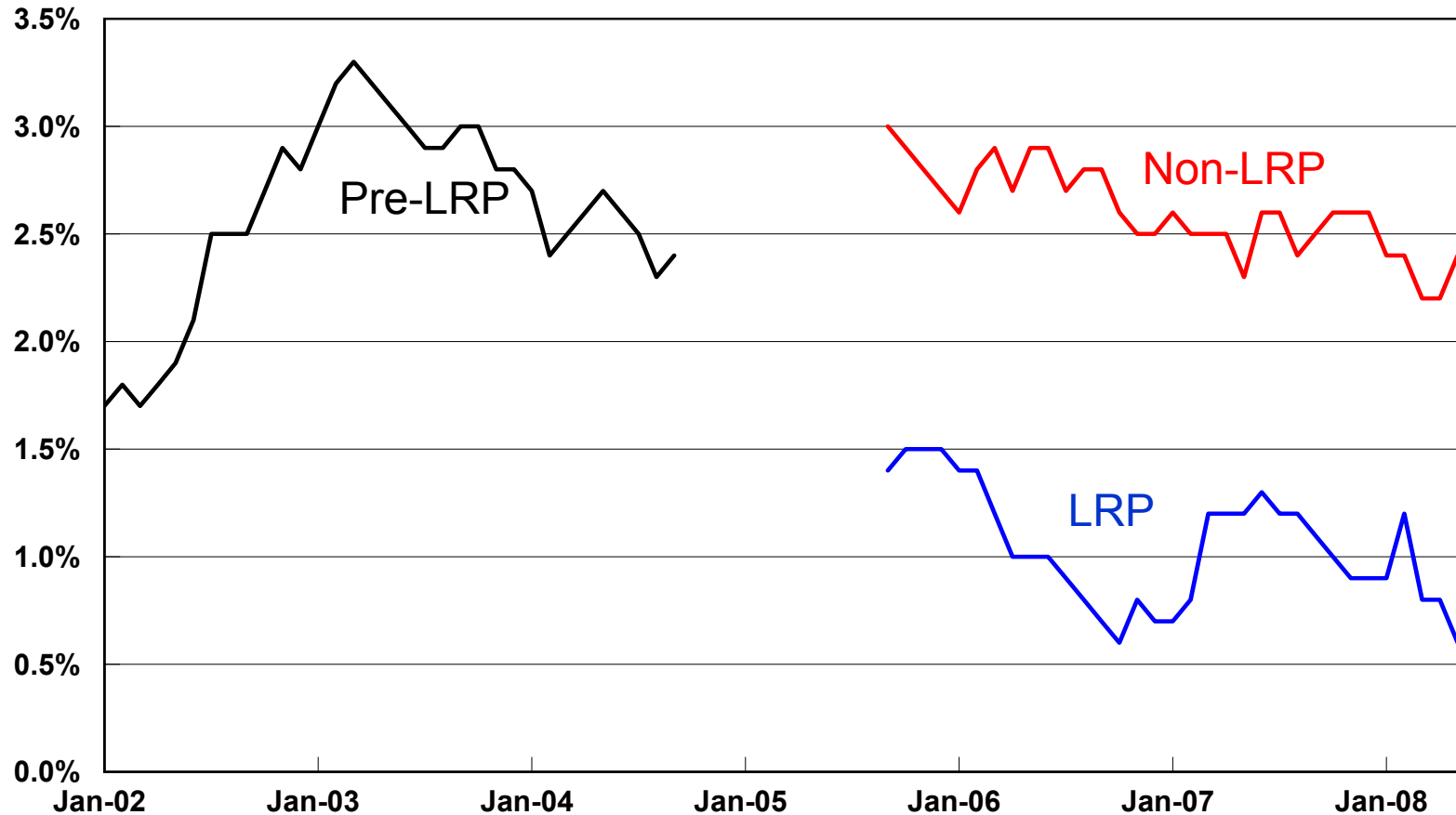
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Number of CFSA Social Workers in the LRP Program



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Rate of Social Workers Leaving CFSA or
Moving to Non-Case-Carrying Status: Pre-LRP, LRP, and NON-LRP Rates
12 Month Moving Average: Jan. 2002 - May 2008



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Four Groups of Social Workers with Respect to the LRP

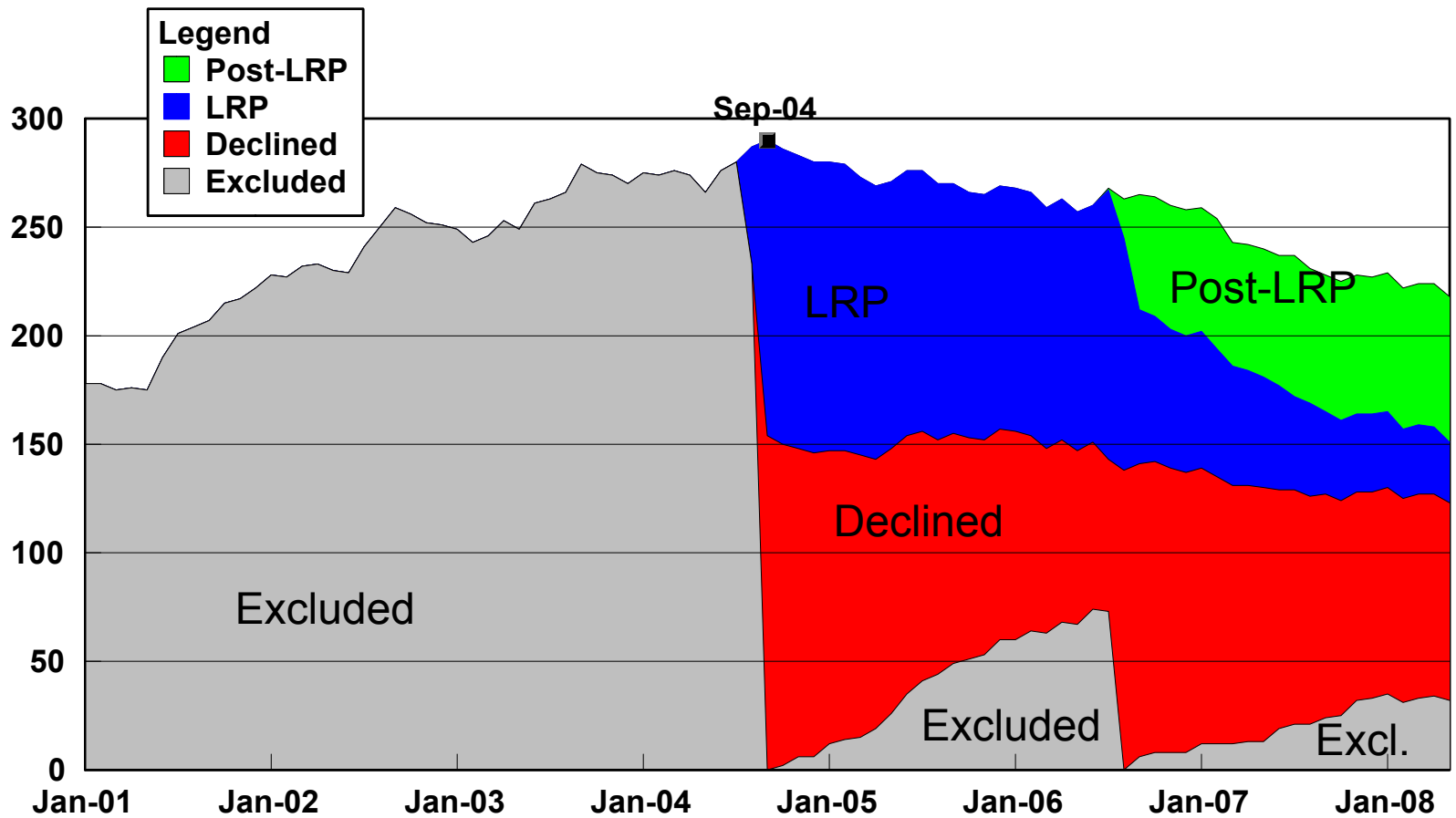
These four groups are the key to much of the analysis to follow:

- Enrolled in LRP
- Post-LRP : Social workers who enrolled in LRP but have since completed their two year (or longer) commitment
- Declined LRP: Social workers who could have enrolled in LRP but did not, either because they did not have student loan debt or because they chose not to for some other reason
- Excluded: Social workers who did not have the opportunity to enroll in LRP because of timing. All social workers are “excluded” prior to Aug 2004 because LRP did not exist. A social worker who started with CFSA after LRP enrollment ended (e.g. November 2004) would be excluded until the next LRP program enrollment period.

A single social worker can be in different groups over time.

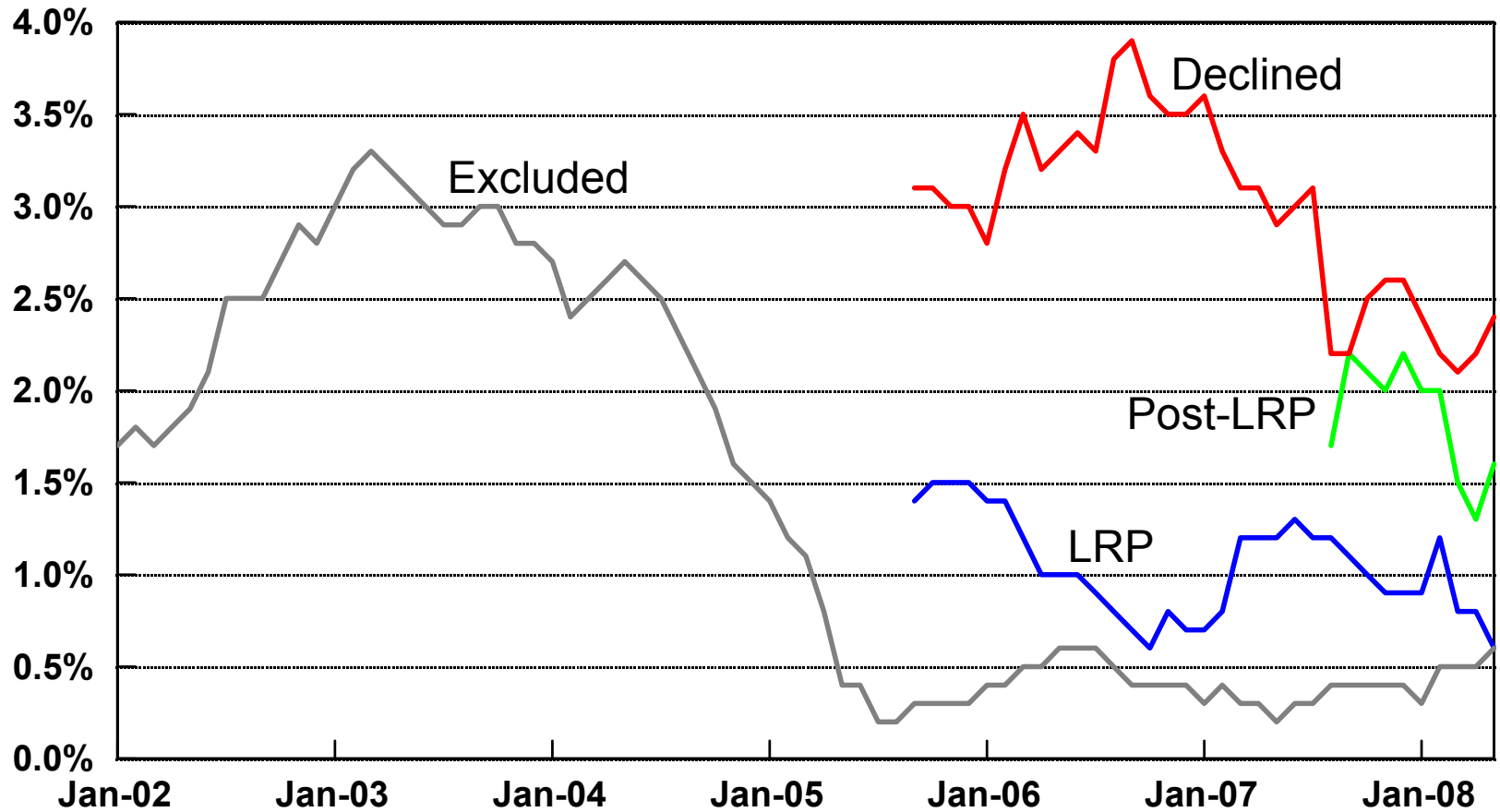
Kairos Management: CFSA Social Worker Loan Repayment Evaluation

Four Groups of Social Workers with Respect to the LRP



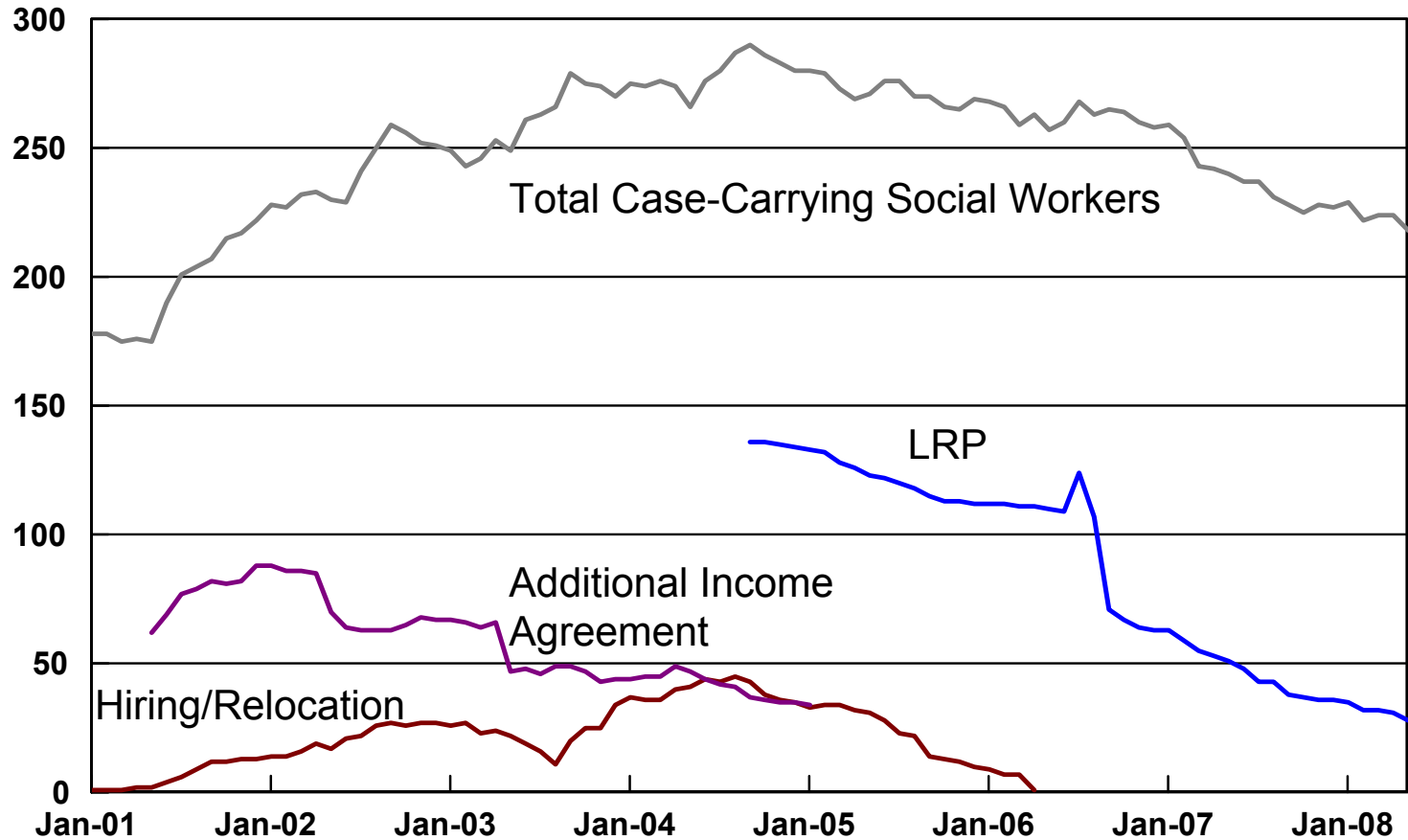
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Rate of Social Workers Leaving CFSA or Moving to Non-Case-Carrying Status: 12 Month Moving Average: Jan 2002 - May 2008
By Four LRP-Related Groupings



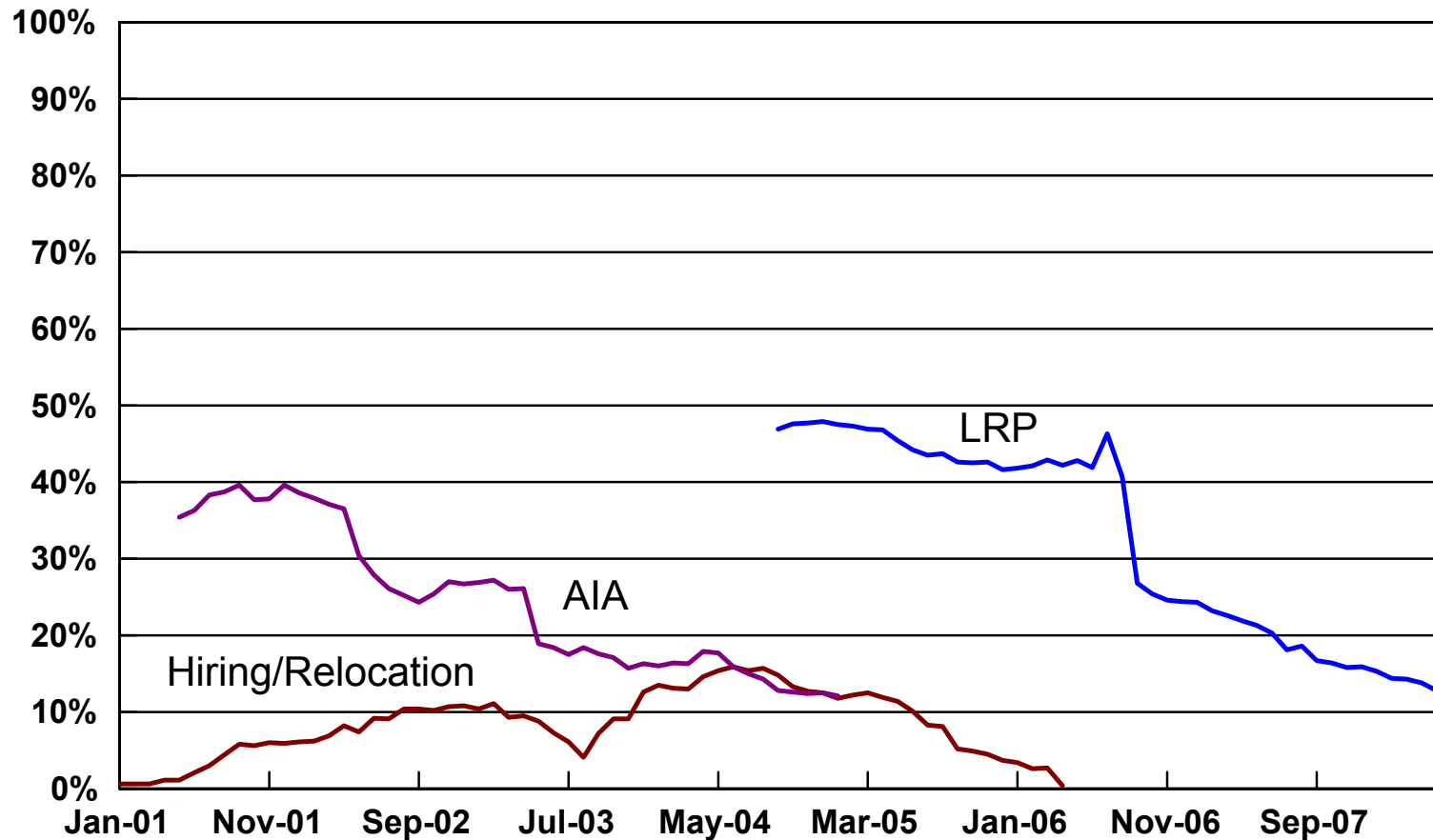
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Number of Case-Carrying Social Workers:
Total and Those Under Retention Program Agreement:
Jan 2001 - May 2008



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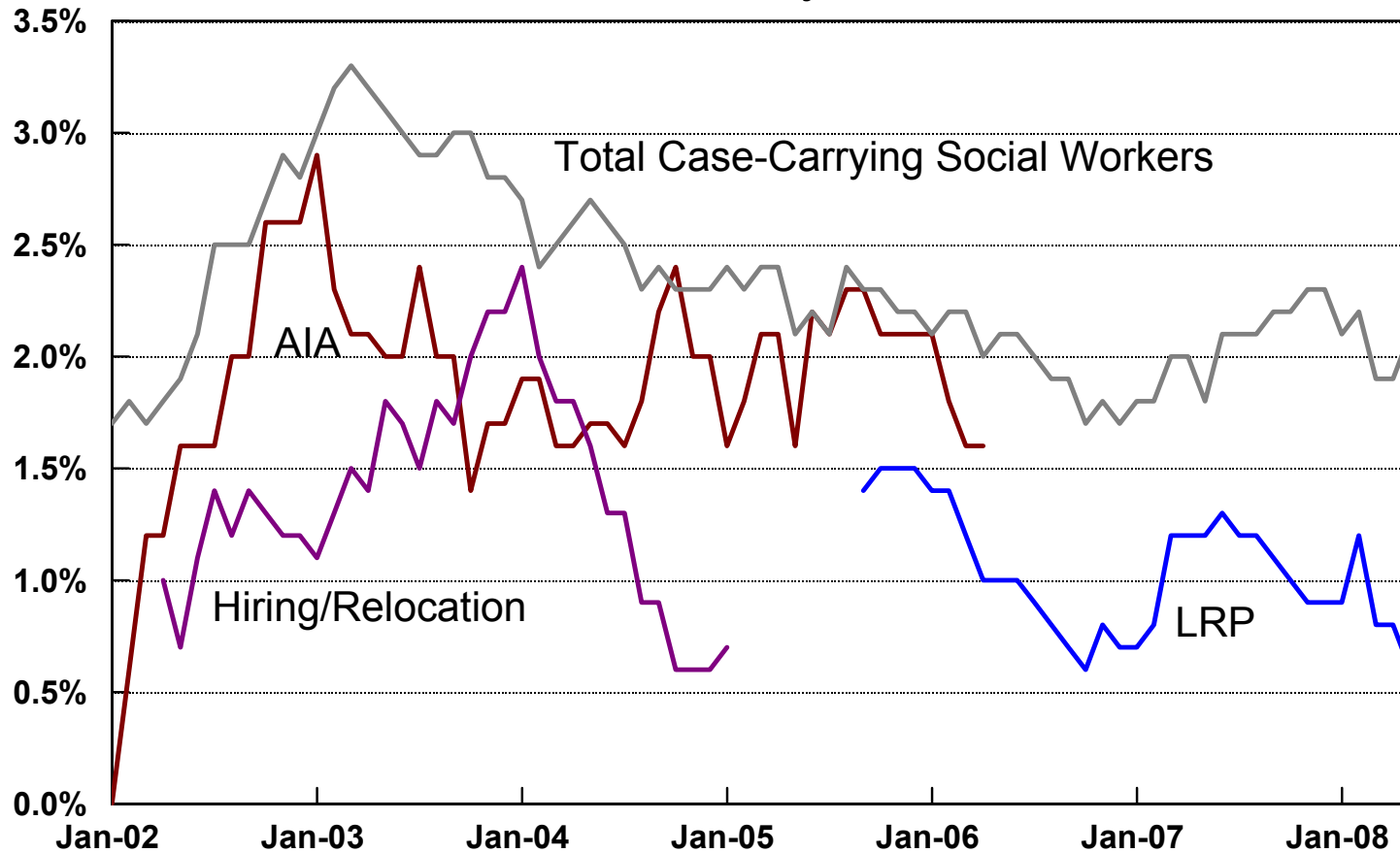
Percentage of Social Workers Under Retention Program Agreement: Jan 2001 - May 2008



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Rate of Social Workers Leaving CFSA or Moving to Non-Case-Carrying Status: 12 Month Moving Average, Total and By Retention Program:

Jan 2002 - May 2008



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Key Statistics: Percentage of “Leavers” for Various Subgroups, Ranked Highest to Lowest

Group	Time Period	Average Monthly "Leavers" Rate
Declined LRP	Sep 2004 - May 2008	2.88%
Excluded ("Pre-LRP")	Jan 2001 - Aug 2004	2.45%
All CCSW	Jan 2001 - May 2008	2.25%
Hiring/Bilingual/Relocation Bonus	Sep 2001 - Dec 2005	1.96%
Post-LRP	Sep 2006 - May 2008	1.56%
Additional Income Allowance	May 2001 - Jan 2005	1.29%
LRP	Sep 2004 - May 2008	1.00%
Excluded ("Post-LRP")	Sep 2004 - May 2008	0.41%

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Key Statistics on Rates of Leavers, A Good Start but Flawed

Why are the Key Statistics on Leaver Rates Flawed?

- No tests for statistical significance
- No controls for amount of time persons have worked for CFSA
- No controls for other variables such as age and education
- Still have not considered the role of selection bias

So now we move to statistical estimation techniques using survival analysis methods – specifically designed for this type of analysis.

IV. Statistical Modeling of the Impact of LRP

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Survival Analysis

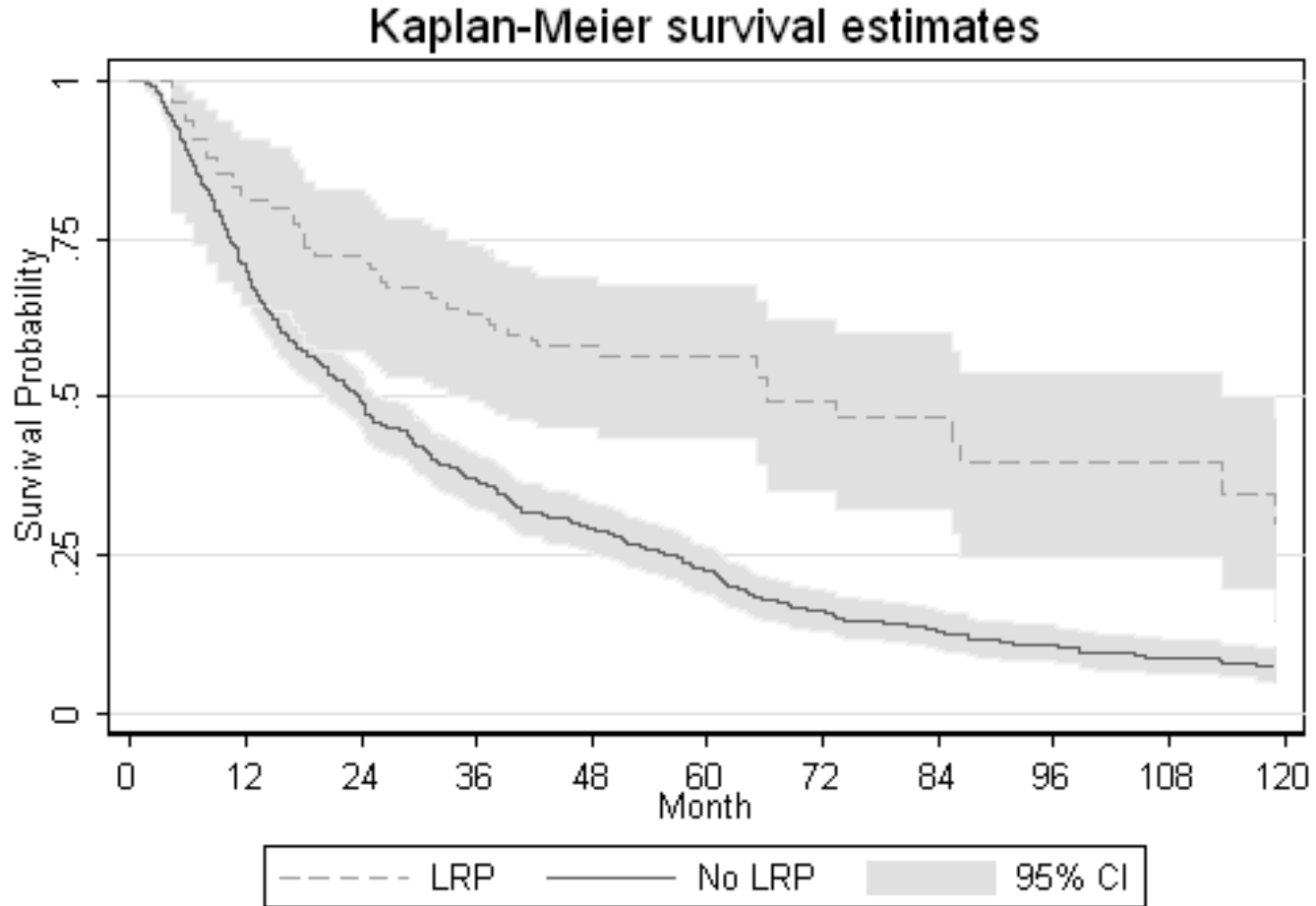
Survival analysis is the set of statistical analysis methods concerned with analyzing the time to the occurrence of an event and the factors that influence the timing and occurrence of the event.

Our event of interest: Social workers leaving CFSA or leaving case-carrying status.

Special terminology and methods are used because the more commonly known methods such as linear regression are not valid in this framework. Yet this type of analysis is very common in the social sciences.

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Estimates of Survivor Function for LRP vs. Non-LRP Social Workers, with Confidence Intervals



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Statistical Tests on LRP vs. Non-LRP Survival Functions

Estimates with confidence intervals on the previous slide show that the LRP and non-LRP survival functions are significantly different. The functions diverge and the 95% confidence interval bands do not overlap.

We also performed statistical tests* and determined that the survival functions are statistically different from each other. This is highly significant at the 99.9% significance level.

Therefore we can say with confidence that Social Workers in the LRP do have better retention than those not in LRP.

* Log-rank, Wilcoxon, Tarone-Ware, and Peto-Peto-Prentice tests all yielded a highly statistically significant result.

Finally... Dealing with Self-Selection Bias

- Theoretical argument on the minimal impact of self-selection bias:
 - Because there is an eligibility criterion not influenced by self-selection (*i.e.*, the presence of student loan debt), the comparison group of non-LRP Social Workers is not as greatly differentiated by the self-selection problem – in other words, some persons who are non-LRP would be willing to participate but cannot because they don't have student loan debt
 - Social workers have the opportunity to terminate the agreement without penalty by leaving CFSA prior to the first payment being sent. This mitigates the risk of enrolling in the program somewhat, theoretically leading to a high percentage of all eligible persons enrolling.
- Structure of comparison groups to account for selection bias:
 - By using a comparison group of persons excluded from LRP due to the timing of their employment, we have a comparison group free from self-selection bias
 - By estimating the separate impact on persons who declined LRP, we can determine whether they are, in fact, different from the LRP and excluded groups

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Results of Cox Proportional Hazards Model Estimation

Predicting Resignations, Terminations, and Position Changes

	Hazard ratio	Cox coefficient	Standard error
*** LRP	38%	-0.9780	0.1783
Declined LRP	103%	0.0336	0.1141
** Post-LRP	59%	-0.5301	0.2542
Age 25 - 34	109%	0.0898	0.2493
Age 35 - 44	87%	-0.1445	0.2704
Age 45 - 54	110%	0.0970	0.2823
Age 55 - 64	79%	-0.2301	0.3392
Age 65 +	90%	-0.1093	0.4808
** Years since degree	110%	0.0962	0.0459
** Years since degree - squared	99%	-0.0102	0.0040
*** Years since degree - cubed	100%	0.0002	0.0001
** Has MSW	66%	-0.4116	0.1615
Male	112%	0.1115	0.1193
* Went to local university	81%	-0.2089	0.1135
Went to "Top 25" MSW program	108%	0.0755	0.1643
*** Has own DC gov health insurance	71%	-0.3385	0.1316
** Has child on health insurance	74%	-0.3050	0.1466
* Has other dependent on health ins.	141%	0.3403	0.1873
*** Married	69%	-0.3677	0.1264
*** Additional Income Agreement	47%	-0.7653	0.1973
** Hiring/Bilingual/Relocation Bonus	64%	-0.4540	0.2036

Significance level: *** .01 ** .05 * .1

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Results of Cox Proportional Hazards Model Estimation

Predicting Resignations Only

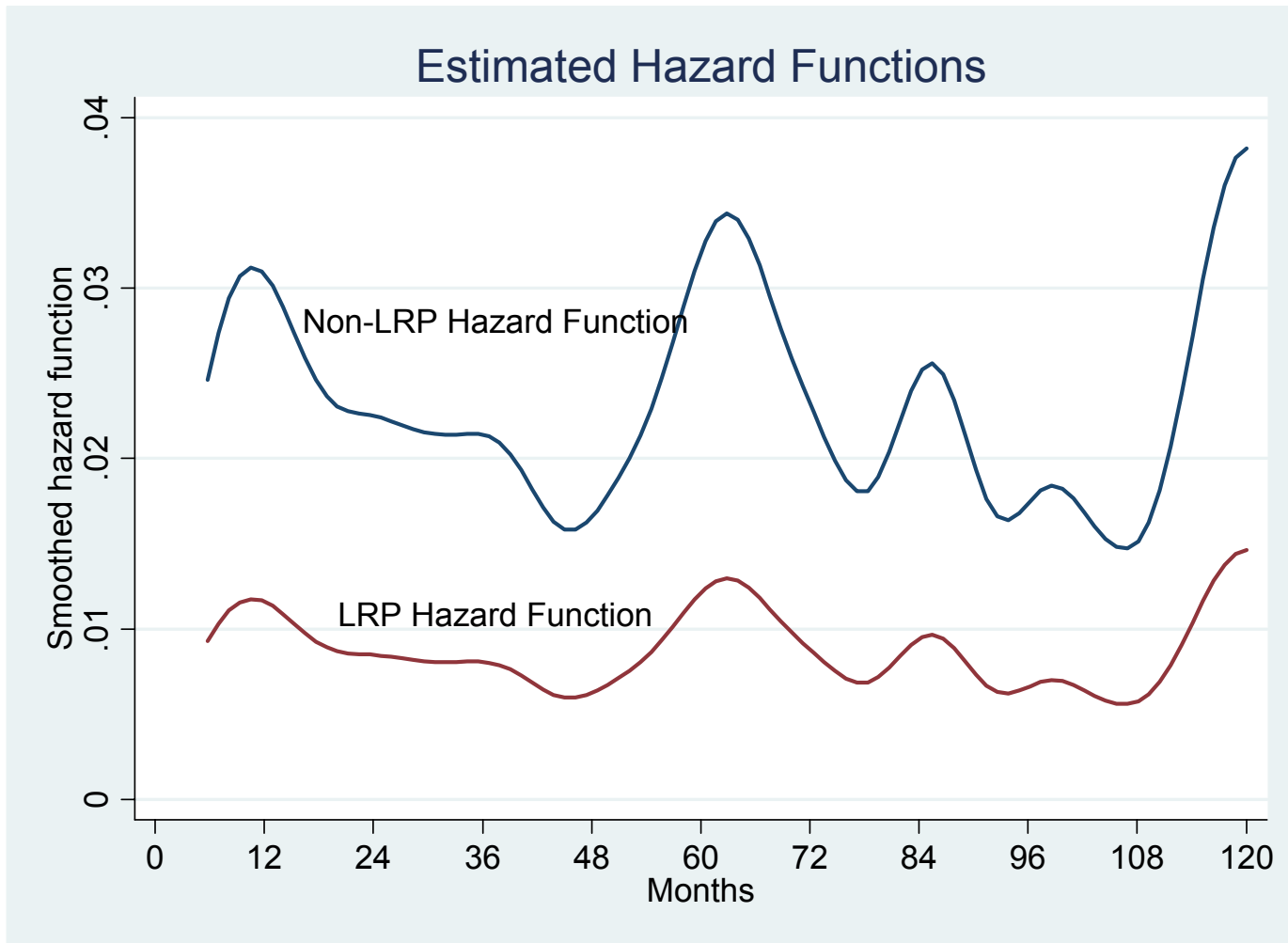
	Hazard ratio	Cox coefficient	Standard error
*** LRP	53%	-0.6406	0.1997
Declined LRP	123%	0.2057	0.1344
Post-LRP	65%	-0.4258	0.3357
Age 25 - 34	111%	0.1069	0.2719
Age 35 - 44	78%	-0.2524	0.3040
Age 45 - 54	114%	0.1315	0.3152
Age 55 - 64	106%	0.0576	0.3763
Age 65 +	99%	-0.0093	0.6030
Years since degree	110%	0.0981	0.0552
*** Years since degree - squared	99%	-0.0132	0.0051
*** Years since degree - cubed	100%	0.0003	0.0001
** Has MSW	66%	-0.4226	0.1880
Male	107%	0.0674	0.1481
Went to local university	78%	-0.2443	0.1379
Went to "Top 25" MSW program	111%	0.1004	0.1919
*** Has own DC gov health insurance	56%	-0.5882	0.1511
Has child on health insurance	70%	-0.3541	0.1905
Has other dependent on health ins.	108%	0.0809	0.2557
*** Married	65%	-0.4296	0.1519
*** Additional Income Agreement	28%	-1.2759	0.3194
Hiring/Bilingual/Relocation Bonus	72%	-0.3258	0.2216

Significance level: *** .01 ** .05 * .1

Summary of Cox Model Estimation

- Social Workers in the LRP are only 38% as likely to leave (resign, be terminated, or switch positions) as compared to the “baseline” – and are only 58% as likely to resign. These are strong and statistically significant findings. No other factor in the model has as strong an impact on retention as LRP enrollment.
- Social Workers who declined LRP are not statistically significantly different from Social Workers excluded from LRP – a good indication that self-selection bias is not causing problems.
- Post-LRP Social Workers are only 59% as likely to leave (resign, be terminated, or switch positions) as compared to the “baseline”. But in the second model (resigned only) there is no statistically significant result.
- Social Workers enrolled in AIA were less likely to leave and less likely to resign, a statistically significant result. BUT remember that we did not (and cannot) account for self-selection bias for this estimate.
- Social Workers under an agreement for a Hiring/Bilingual Bonus or Relocation Bonus were less likely to leave (resign, be terminated, or switch positions), as shown in the first model. However, there is no statistical significance in the second model (resigned only).
- Most covariates were statistically significant in the first model (leaving). Fewer were statistically significant in the second model (resigned only).

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Estimates of Hazard Function for LRP vs. Non-LRP Social Workers



Estimating the Impact of the LRP During the Analysis Period

- The difference between the average monthly hazard for LRP and non-LRP is 1.4 percentage points. We can estimate what would have happened if the LRP had not been implemented.
- Applying the 1.4% hazard rate to the persons in the LRP yields the result that between August 2006 and May 2008, **56.4 Social Workers** in LRP would have left CFSA or moved away from case-carrying status in the absence of the LRP.
- This is of course, just an estimate, we do not know what would have actually occurred. But it provides a basis for comparing program costs and benefits.

V. Program Costs and Benefits

LRP Costs and Benefits

COSTS

- * Loan repayments made on behalf of the Social Worker: estimated at \$1.7 million as of May 2008
- Costs to administer the program (staff time)

BENEFITS

- Improved services to children and families
- More experienced social worker staff
- Improved staff morale
- Reduced costs for recruitment
- * Greater social worker efficiencies (less time lost to training new social workers)

* We will focus on these key costs and benefits.

Kairos Management: CFSA Social Worker Loan Repayment Evaluation

Estimated Staff Inefficiencies Due to Turnover

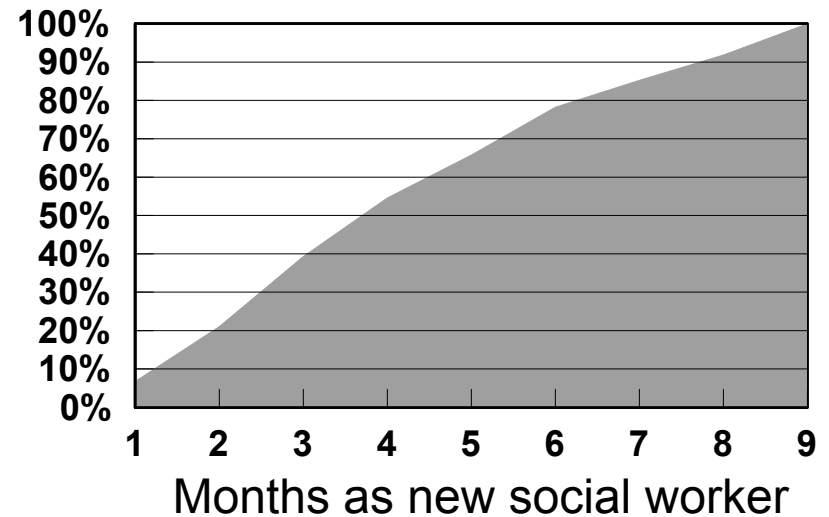
Using data on the number of cases assigned, we looked at the average “learning curve” for new social workers – difference between the number of cases ultimately assigned and the number of cases currently assigned.

We assumed a 9-month learning curve based on exploration of the data.

Monthly inefficiency = Total monthly salary*Fringe rate*(1-point on learning curve)

Example: During 3rd month of work, average social worker has only 39% of cases s/he will ultimately be assigned. Average salary is \$47,879 (3,990/mo) and 17% fringe. Therefore inefficiency is:
 $3,990 * 1.17 * (1 - .39) = \$2,834$

Estimated Average Learning Curve for New Social Workers During First 9 Months



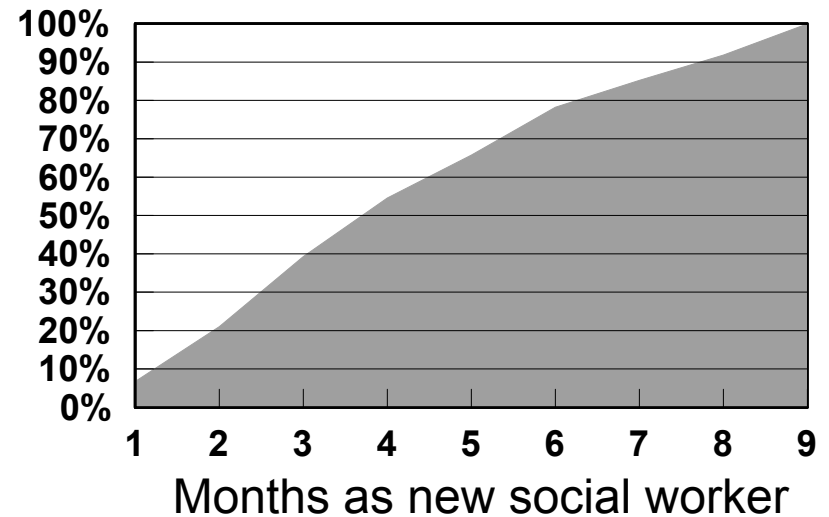
Estimated Staff Inefficiencies Due to Turnover (continued)

The estimated average salary inefficiency for a new Social Worker during the first 9 months of his/her tenure is \$16,680.

The statistical estimate of the number of Social Workers who would have left in the absence of the LRP is 56.4.

Therefore the benefit of the LRP based on staff efficiencies is:
 $\$16,680 * 56.4 = \$940,000$

Estimated Average Learning Curve for New Social Workers During First 9 Months



LRP Costs and Benefits

The total measured cost of the LRP (loan repayments made) through May 2008 is \$1.7 million.

The total measured benefit (staff inefficiencies saved) is \$940,000.

Therefore the net cost is \$760,000.

If the benefits other than staff inefficiencies exceed \$760,000, then the LRP provides a net benefit.

This is certainly difficult to determine precisely, but it provides a reference point for decision-making.

Final point on cost: At estimated 56.4 persons retained who would have otherwise left –

Total cost per social worker retained = \$30,140

Net cost per social worker retained = \$13,475