Bibliography

[1] Aareal Bank AG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[2] V. Acharya, D. Gale, and T. Yorulmazer. Rollover Risk and Market Freezes. NBER Working Paper No. 15674, January 2010.

[3] V. Acharya, J.-Z. Huang, M. Subrahmanyam, and R. K. Sundaram. When does strategic debt-service matter? Economic Theory, Vol. 29, Issue 2, October 2006, pp. 363–378.

[4] T. Ahnert, K. Anand, P. Gai, and J. Chapman. Safe, or not safe? Covered bonds and Bank Fragility. In: Beiträge zur Jahrestagung des Vereins für Socialpolitik 2015: Ökonomische Entwicklung - Theorie und Politik - Session: Finance and Banks II, No. F09-V3.

[5] E. Altman, A. Resti, and A. Sironi. Default Recovery Rates in Credit Risk Modeling: A Review of the Literature and Empirical Evidence. NYU Working Paper No. S-CDM-03-11, December 2003.

[6] R. Anderson and S. Sundaresan. A comparative study of structural models of corporate bond yields: An exploratory investigation. Journal of Banking & Finance, Vol. 24, 2000, pp. 255–269.

[7] R. W. Anderson and N. Cakici. The Value of Deposit Insurance in the Presence of Interest Rate and Credit Risk. Financial Markets, Institutions & Instruments, Vol. 8, No. 5, November 1999, pp. 45–62.

[8] R. W. Anderson and A. Carverhill. Liquidity and Capital Structure. CEPR Discussion Paper No. 6044, January 2007.

[9] R. W. Anderson and S. Sundaresan. Design and Valuation of Debt Contracts. Review of Financial Studies, Vol. 9, No. 1, 1996, pp. 37–68.

[10] R. W. Anderson, S. Sundaresan, and P. Tychon. Strategic analysis of contingent claims. European Economic Review, Vol. 40, Issue 3–5, April 1996, pp. 871–881.

M. Spangler, *Modelling German Covered Bonds*, Mathematische Optimierung und Wirtschaftsmathematik | Mathematical Optimization and Economathematics,
https://doi.org/10.1007/978-3-658-23915-2

[11] A. Arvanitis and J. Gregory. *Credit: The Complete Guide to Pricing, Hedging and Risk Management.* Risk Books, London, 2001.

[12] A. Asvanunt, M. Broadie, and S. Sundaresan. Managing Corporate Liquidity: Strategies and Pricing Implications. International Journal of Theoretical and Applied Finance, Vol. 14, No. 3, 2011, pp. 369–406.

[13] Basel Committee on Banking Supervision. Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring tools. BIS Publication, January 2013.

[14] Basel Committee on Banking Supervision. Principles for Sound Liquidity Risk Management and Supervision. BIS Publication, September 2008.

[15] M. Baxter and A. Rennie. *Financial calculus: An introduction to derivative pricing.* Cambride University Press, 2003.

[16] Bayerische Landesbank. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[17] Berlin-Hannoversche Hypothekenbank AG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[18] T. R. Bielecki and M. Rutkowski. *Credit Risk: Modeling, Valuation and Hedging.* Springer-Verlag, Berlin Heidelberg, 2004.

[19] F. Black and J. C. Cox. Valuing Corporate Securities: Some Effects of Bond Indenture Provisions. The Journal of Finance, Vol. 31, Issue 2, May 1976, pp. 351–367.

[20] F. Black and M. Scholes. The Pricing of Options and Corporate Liabilities. The Journal of Political Economy, Vol. 81, Issue 3, 1973, pp. 637–654.

[21] C. Bluhm, L. Overbeck, and C. Wagner. *An Introduction to Credit Risk Modeling.* Financial Mathematics Series. Chapman & Hall/CRC, London, 2003.

[22] Bremer Landesbank. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[23] D. Brigo, A. Dalessandro, M. Neugebauer, and F. Triki. A Stochastic Processes Toolkit for Risk Management. Working Paper, November 2007.

[24] D. Brigo and F. Mercurio. *Interest Rate Models - Theory and Practice: With Smile, Inflation and Credit.* Springer-Verlag, Berlin Heidelberg, 2nd edition, 2006.

[25] E. Briys and F. de Varenne. Valuing Risky Fixed Rate Debt: An Extension. Journal of Financial and Quantitative Analysis, Vol. 32, No. 2, June 1997, pp. 239–248.

[26] M. Broadie, M. Chernov, and S. Sundaresan. Optimal Debt and Equity Values in the Presence of Chapter 7 and Chapter 11. The Journal of Finance, Vol. 62, No. 3, June 2007, pp. 1341–1377.

[27] A. Charitou, N. Lambertides, and L. Trigeorgis. Bankruptcy prediction and structural credit risk models. In: Advances in Credit Risk Modelling and Corporate Bankruptcy Prediction, Edited by Stewart Jones and David A. Hensher, Cambridge University Press, 2008.

[28] R.-R. Chen, N. K. Chidambaran, M. B. Imerman, and B. J. Sopranzetti. Anatomy of Financial Institutions in Crisis: Endogenous Modeling of Bank Default Risk. Working Paper, January 2012.

[29] R.-R. Chen, S.-Y. Hu, and G.-G. Pan. Default Prediction of Various Structural Models. Working Paper, Rutgers University, National Taiwan University, and National Ping-Tung University of Sciences and Technologies, July 2006.

[30] P. Collin-Dufresne and R. S. Goldstein. Do Credit Spreads Reflect Stationary Leverage Ratios? The Journal of Finance, Vol. 56, No. 5, October 2001, pp. 1929–1957.

[31] P. Collin-Dufresne, R. S. Goldstein, and J. S. Martin. The Determinants of Credit Spread Changes. The Journal of Finance, Vol. 56, No. 6, December 2001, pp. 2177–2207.

[32] Commerzbank AG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[33] Committee on the Global Financial System. Asset encumbrance, financial reform and the demand for collateral assets. CGFS Papers No 49, BIS Publication, May 2013.

[34] Corealcredit Bank AG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[35] P. Crosbie and J. Bohn. Modeling Default Risk. Moody's KMV, Modeling Methodology, December 2003.

[36] S. A. Davydenko. When Do Firms Default? A Study of the Default Boundary. EFA Moscow Meetings Paper, November 2012.

[37] DBRS. Rating European Covered Bonds. Methodology, January 2014.

[38] DekaBank Deutsche Girozentrale. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[39] Deutsche Apotheker- und Ärztebank eG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[40] Deutsche Bank. The Pfandbrief and other covered bonds in the EU capital market: development and regulation. Deutsche Bank Research, October 2003.

[41] Deutsche Bundesbank. Ergebnisse der fünften Auswirkungsstudie zu Basel II in Deutschland. June 2006.

[42] Deutsche Genossenschafts-Hypothekenbank AG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[43] Deutsche Hypothekenbank. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[44] Deutsche Kreditbank AG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[45] Deutsche Pfandbriefbank AG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[46] Deutsche Postbank AG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[47] Deutscher Bundestag. Entwurf eines Gesetzes zur Umsetzung der Richtlinie 2002/47/EG vom 6. Juni 2002 über Finanzsicherheiten und zur Änderung des Hypothekenbankgesetzes und anderer Gesetze. Drucksache 15/1853, 29.10.2003.

[48] Dexia Kommunalbank Deutschland AG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[49] G. Dionne and S. Laajimi. On the determinants of the implied default barrier. Journal of Empirical Finance, Vol. 19, Issue 3, June 2012, pp. 395–408.

[50] L. Dubrana. A Stochastic Model for Credit Spreads Under a Risk-Neutral Framework Through the Use of an Extended Version of the Jarrow, Lando and Turnbull Model. SSRN Working Paper, June 2011.

[51] D. Duffie and K. J. Singleton. Modeling Term Structures of Defaultable Bonds. The Review of Financial Studies, Vol. 12, No. 4, 1999, pp. 687–720.

[52] D. Duffie and K. J. Singleton. *Credit Risk: Pricing, Measurement, and Management*. Princenton Series in Finance. Princeton University Press, 2003.

[53] Düsseldorfer Hypothekenbank AG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[54] DVB Bank SE. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[55] A. Elizalde. Credit Risk Models I: Default Correlation in Intensity Models. CEMFI Working Paper No. 0605, April 2006.

[56] A. Elizalde. Credit Risk Models II: Structural Models. CEMFI Working Paper No. 0606, April 2006.

[57] A. Elizalde. Credit Risk Models III: Reconciliation Reduced – Structural Models. CEMFI Working Paper No. 0607, April 2006.

[58] E. J. Elton, M. J. Gruber, D. Agrawal, and C. Mann. Explaining the Rate Spread on Corporate Bonds. The Journal of Finance, Vol. 56, Issue 1, February 2001, pp. 247–277.

[59] Y. H. Eom, J. Helwege, and J.-Z. Huang. Structural Models of Corporate Bond Pricing: An Empirical Analysis. Review of Financial Studies, Vol. 17, No. 2, 2004, pp. 499–544.

[60] J. Ericsson and J. Reneby. The Valuation of Corporate Liabilities: Theory and Tests. SSE/EFI Working Paper Series in Economics and Finance, No. 445, January 2003.

[61] M. Escobar, T. Friedrich, L. Seco, and R. Zagst. A General Structural Approach For Credit Modeling Under Stochastic Volatility. Capco Journal of Financial Transformation, Vol. 32, August 2011, pp. 123–132.

[62] European Covered Bond Council. European Covered Bond Fact Book. ECBC Publication, 11th edition, August 2016.

[63] European Covered Bond Council. European Covered Bond Fact Book. ECBC Publication, 7th edition, September 2012.

[64] European Covered Bond Council. European Covered Bond Fact Book. ECBC Publication, 8th edition, September 2013.

[65] European Covered Bond Council. European Covered Bond Fact Book. ECBC Publication, 9th edition, September 2014.

[66] European Covered Bond Council. European Covered Bond Fact Book. ECBC Publication, 10th edition, August 2015.

[67] F. J. Fabozzi, editor. *Handbook of Finance: Financial Markets and Instruments*, volume 1. John Wiley & Sons, Inc., Hoboken, New Jersey, 2008.

[68] F. J. Fabozzi, editor. *Handbook of Finance: Valuation, Financial Modeling and Quantitative Tools*, volume 3. John Wiley & Sons, Inc., Hoboken, New Jersey, 2008.

[69] F. J. Fabozzi, R.-R. Chen, S.-Y. Hu, and G.-G. Pan. Tests of the performance of structural models in bankruptcy prediction. The Journal of Credit Risk, Vol. 6, No. 2, Summer 2010, pp. 37–78.

[70] H. Fan and S. Sundaresan. Debt Valuation, Renegotiation, and Optimal Dividend Policy. The Review of Financial Studies, Vol. 13, No. 4, 2000, pp. 1057 – 1099.

[71] E. O. Fischer, R. Heinkel, and J. Zechner. Dynamic Capital Structure Choice: Theory and Tests. The Journal of Finance, Vol. 44, No. 1, March 1989, pp. 19–40.

[72] P. François and E. Morellec. Capital Structure and Asset Prices: Some Effects of Bankruptcy Procedures. Journal of Business, Vol. 77, No. 2, April 2004, pp. 387–411.

[73] J. Frye. Depressing recoveries. Risk, November 2000, pp. 108–111.

[74] D. Galai, A. Raviv, and Z. Wiener. Liquidation triggers and the valuation of equity and debt. Journal of Banking & Finance, Vol. 31, No. 12, December 2007, pp. 3604–3620.

[75] R. Geske. The Valuation Of Compound Options. Journal of Financial Economics, Vol. 7, No. 1, March 1979, pp. 63–81.

[76] R. Geske. The Valuation Of Corporate Liabilities As Compound Options. Journal of Financial and Quantitative Analysis, Vol. 12, No. 4, November 1977, pp. 541–552.

[77] R. Geske and H. E. Johnson. The Valuation of Corporate Liabilities as Compound Options: A Correction. Journal of Financial and Quantitative Analysis, Vol. 19, No. 2, June 1984, pp. 231–232.

[78] P. Glassermann. *Monte Carlo Methods in Financial Engineering*. Springer Verlag, 2003.

[79] R. S. Goldstein, N. Ju, and H. Leland. An EBIT-Based Model of Dynamic Capital Structure. Journal of Business, Vol. 74, No. 4, October 2001, pp. 483–512.

[80] R. Grossmann and O. Stöcker. Overview of covered bonds. In: European Covered Bond Council: *European Covered Bond Fact Book*, ECBC Publication, 11th edition, August 2016, pp. 131–144.

[81] X. Guo, R. A. Jarrow, and Y. Zeng. Credit Risk Models with Incomplete Information. Mathematics of Operations Research, Vol. 34, No. 2, May 2009, pp. 320–332.

[82] L. Hagen and R. Holter. Auswirkungen von Basel II auf das Risikomanagement deutscher Hyopthekenbanken. In: Verband Deutscher Hypothekenbanken, Professionelles Immobilien-Banking, 1st edition, Berlin, 2002, pp. 53–64.

[83] Hamburger Sparkasse AG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[84] F. Hillenbrand. Covered Bonds in der Insolvenz – ein systematischer Überblick. in: Immobilien & Finanzierung 14, 2013.

[85] T. S. Y. Ho and R. F. Singer. Bond indenture provisions and the risk of corporate debt. Journal of Financial Economics, Vol. 10, Issue 4, December 1982, pp. 375–406.

[86] HSH Nordbank AG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[87] J. C. Hsu, J. Saá-Requejo, and P. Santa-Clara. A Structural Model of Default Risk. The Journal of Fixed Income, Vol. 19, No. 3, Winter 2010, pp. 77–94.

[88] J. Huang and M. Huang. How Much of the Corporate-Treasury Yield Spread is Due to Credit Risk? Review of Asset Pricing Studies, Vol. 2, No. 2, 2012, pp. 153–202.

[89] M. Hughes and R. Werner. Choosing Markovian Credit Migration Matrices by Nonlinear Optimization. Risks, Vol. 4, No. 3, August 2016.

[90] M. Hughes and R. Werner. On the Valuation of German Covered Bonds – One Period Approaches. Working Paper, 2014.

[91] J. Hull and A. White. An Analysis of the Bias in Option Pricing Caused by a Stochastic Volatility. Advances in Futures and Options Research, Vol. 3, 1988, pp. 29–61.

[92] J. Hull and A. White. Branching Out. Risk 7, 1994, pp. 34–37.

[93] M. B. Imerman. Structural credit risk models in banking with applications to the financial crisis. Dissertation, 2011.

[94] ING-DiBa AG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[95] International Financing Review. Roundtable Covered Bonds. IFR Report, March 2017.

[96] R. A. Jarrow, D. Lando, and S. M. Turnbull. A Markov Model for the Term Structure of Credit Risk Spreads. The Review of Financial Studies, Vol. 10, No. 2, Summer 1997, pp. 481–523.

[97] R. A. Jarrow and P. Protter. Structural Versus Reduced Form Models: A New Information Based Perspective. Journal of Investment Management, Vol. 2, No. 2, May 2004, pp. 1–10.

[98] R. A. Jarrow and S. M. Turnbull. Pricing Derivatives on Financial Securities Subject to Credit Risk. The Journal of Finance, Vol. 50, No. 1, March 1995, pp. 53–85.

[99] N. Ju, R. Parrino, A. M. Poteshman, and M. S. Weisbach. Horses and Rabbits? Trade-Off Theory and Optimal Capital Structure. Journal of Financial and Quantitative Analysis, Vol. 40, No. 2, June 2005, pp. 259–281.

[100] I. J. Kim, K. Ramaswamy, and S. Sundaresan. Does Default Risk in Coupons Affect the Valuation of Corporate Bonds?: A Contingent Claims Model. Financial Management, Vol. 22, No. 3, Autumn 1993, pp. 117–131.

[101] J. King and F. Will. The repo treatment of covered bonds by central banks. In: European Covered Bond Council: *European Covered Bond Fact Book*, ECBC Publication, 9th edition, September 2014, pp. 132–163.

[102] T. Koppmann. *Gedeckte Schuldverschreibungen in Deutschland und Großbritanien: Pfandbriefe und UK Covered Bonds im Rechtsvergleich.* Schriften zum Europäischen und Internationalen Privat-, Bank- und Wirtschaftsrecht (31). De Gruyter Verlag, Berlin, 2009.

[103] Kreissparkasse Köln. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[104] S. Laajimi. Structural Credit Risk Models: A Review. Insurance and Risk Management, Vol. 80, No. 1, April 2012, pp. 53–93.

[105] Landesbank Baden-Württemberg. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[106] Landesbank Berlin. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[107] Landesbank Hessen-Thüringen. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[108] D. Lando. *Credit Risk Modeling: Theory and Applications.* Princenton Series in Finance. Princeton University Press, 2004.

[109] H. Langer and A. Schadow. Pre-insolvency proceedings and regulatory changes – challenging times for covered bonds. In: European Covered Bond Council: *European Covered Bond Fact Book*, ECBC Publication, 8th edition, September 2013, pp. 87–93.

[110] Lebensausschuss der DAV. *Stochastisches Unternehmensmodell für deutsche Lebensversicherungen: Abschlussbericht der DAV-Arbeitsgruppe.* Verlag Versicherungswirtschaft GmbH Karlsruhe, 2005.

[111] H. E. Leland. Corporate Debt Value, Bond Covenants, and Optimal Capital Structure. The Journal of Finance, Vol. 49, No. 4, September 1994, pp. 1213–1252.

[112] H. E. Leland. Predictions of Default Probabilities in Structural Models of Debt. Working Paper, April 2004.

[113] H. E. Leland and K. B. Toft. Optimal Capital Structure, Endogenous Bankruptcy, and the Term Structure of Credit Spreads. The Journal of Finance, Vol. 51, No. 3, July 1996, pp. 987–1019.

[114] G. Liang, E. Lütkebohmert, and Y. Xiao. A Multi-Period Bank Run Model for Liquidity Risk. Review of Finance, Vol. 18, No. 2, April 2014, pp. 803–842.

[115] G. Liang, E. Lütkebohmert, and Y. Xiao. A Multi-Period Bank Run Model for Liquidity Risk – Data Supplement. Review of Finance, Vol. 18, No. 2, April 2014.

[116] F. Longstaff and E. Schwartz. A Simple Approach to Valuing Risky Fixed and Floating Rate Debt. The Journal of Finance, Vol. 50, No. 3, July 1995, pp. 789–819.

[117] S. P. Mason and S. Bhattacharya. Risky debt, jump processes, and safety covenants. Journal of Financial Economics, Vol. 9, Issue 3, September 1981, pp. 281 – 307.

[118] F. J. Massey. The Kolmogorov-Smirnov Test for Goodness of Fit. Journal of the American Statistical Association, Vol. 46, No. 253, 1951, pp. 68–78.

[119] L. Matz. Contingency Planning. In: L. Matz & P. Neu (ed.): *Liquidity Risk: Measurement and Management*, John Wiley & Sons (Asia) Pte Ltd, Singapore, 2007, pp. 121–145.

[120] L. Matz and P. Neu. Liquidity Risk Management Strategies and Tactics. In: L. Matz & P. Neu (ed.): *Liquidity Risk: Measurement and Management*, John Wiley & Sons (Asia) Pte Ltd, Singapore, 2007, pp. 100–120.

[121] L. Matz and P. Neu, editors. *Liquidity Risk: Measurement and Management.* John Wiley & Sons (Asia) Pte Ltd, Singapore, 2007.

[122] P. Mella-Barral. The Dynamics of Default and Debt Reorganization. The Review of Financial Studies, Vol. 12, No. 3, 1999, pp. 535–578.

[123] P. Mella-Barral and W. Perraudin. Strategic Debt Service. The Journal of Finance, Vol. 52, No. 2, June 1997, pp. 531–556.

[124] R. C. Merton. On the Pricing of Corporate Debt: The Risk Structure of Interest Rates. The Journal of Finance, Vol. 29, Issue 2, 1974, pp. 449–470.

[125] M.M.Warburg & CO Hypothekenbank AG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[126] F. Moraux. Valuing Corporate Liabilities When the Default Threshold is not an Absorbing Barrier. Working Paper, University of Rennes, 2002.

[127] E. Morellec. Asset liquidity, capital structure, and secured debt. Journal of Financial Economics, Vol. 61, Issue 2, August 2001, pp. 173–206.

[128] S. Morris and H. S. Shin. Illiquidity Component of Credit Risk. Working Paper, Princeton University, February 2010.

[129] C. Muñoz and B. Mezza. Fitch Ratings' covered bonds rating methodology. In: European Covered Bond Council: *European Covered Bond Fact Book*, ECBC Publication, 8th edition, September 2013, pp. 515–522.

[130] Münchener Hypothekenbank eG. Geschäftsbericht 2014. 2015.

[131] Münchener Hypothekenbank eG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[132] Natixis Pfandbriefbank AG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[133] Nord/LB Norddeutsche Landesbank Girozentrale. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[134] A. Paseka. Debt Valuation with Endogenous Default and Chapter 11 Reorganization. Working Paper, University of Arizona, June 2003.

[135] W. R. M. Perraudin and A. P. Taylor. Liquidity and Bond Market Spreads. EFA 2003 Annual Conference Paper No. 879, June 2003.

[136] M. Pollmann. Das neue Pfandbriefrecht in Deutschland. Diplomarbeit, Fachhochschule der Deutschen Bundesbank, Diplomica Verlag, Hamburg, 2006.

[137] M. Prokopczuk and V. Vonhoff. Risk Premia in Covered Bond Markets. Journal of Fixed Income, Vol. 22, No. 2, pp. 19–29, 2012.

[138] F. Rudolf and K. Rühlmann. Extendable maturity structures - the new normal? In: European Covered Bond Council: *European Covered Bond Fact Book*, ECBC Publication, 11th edition, August 2016, pp. 80–90.

[139] M. Rudolf and A. Saunders. Refinancing Real Estate Loans – Lessons to be Learned from the Subprime Crisis. vdp series of papers, Berlin, 2009.

[140] Saar LB. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[141] P. J. Schönbucher. Valuation of Securities Subject to Credit Risk. Bonn University, Working Paper, 1996.

[142] P. J. Schönbucher. *Credit Derivatives Pricing Models: Models, Pricing and Implementation.* Wiley Finance Series. John Wiley & Sons, 2003.

[143] SEB AG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[144] J. B. Siewert and V. Vonhoff. Liquidity and Credit Risk Premia in the Pfandbrief Market. SSRN Working Paper, September 2011.

[145] M. Spangler and R. Werner. *German Covered Bonds: Overview and Risk Analysis of Pfandbriefe.* SpringerBriefs in Finance, 2014.

[146] Sparkasse KölnBonn. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[147] R. K. Sundaram. The Merton/KMV Approach to Pricing Credit Risk. Working Paper, January 2001.

[148] R. Sünderhauf. *Bewertung des Ausfallrisikos deutscher Hypothekenbank-Pfandbriefe.* BWV Berliner Wissenschafts-Verlag GmbH, 2006.

[149] D. Tasche. Fitting a distribution to Value-at-Risk and Expected Shortfall, with an application to covered bonds. Journal of Credit Risk, Vol. 12, No. 2, pp. 1–34, 2016.

[150] M. Uhrig-Homburg. Cash-flow shortage as an endogenous bankruptcy reason. Journal of Banking & Finance, Vol. 29, Issue 6, June 2005, pp. 1509–1534.

[151] M. Uhrig-Homburg. Valuation of Defaultable Claims - A Survey. Schmalenbach Business Review, Vol. 54, January 2002, pp. 24–57.

[152] UniCredit Bank AG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[153] Valovis Bank AG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[154] O. Vasicek. An Equilibrium Characterization Of The Term Structure. Journal of Financial Economics, Vol. 5, No. 2, November 1977, pp. 177–188.

[155] O. A. Vasicek. Credit Valuation. KMV Publication, March 1984.

[156] Verband Deutscher Pfandbriefbanken. Infobrief, Ausgabe Q2 2016. Available on http://www.pfandbrief.de/.

[157] Verband Deutscher Pfandbriefbanken. Pfandbrief Act (as at November 2015). Brochure.

[158] Verband Deutscher Pfandbriefbanken. The Pfandbrief 2012/2013: Facts and Figures about Europe's Covered Bond Benchmark. Pfandbrief Fact Book, 17th edition, Berlin, 2012.

[159] Verband Deutscher Pfandbriefbanken. The Pfandbrief 2013/2014: Facts and Figures about Europe's Covered Bond Benchmark. Pfandbrief Fact Book, 18th edition, Berlin, 2013.

[160] Verband Deutscher Pfandbriefbanken. The Pfandbrief 2014/2015: Facts and Figures about Europe's Covered Bond Benchmark. Pfandbrief Fact Book, 19th edition, Berlin, 2014.

[161] Verband Deutscher Pfandbriefbanken. The Pfandbrief 2015/2016: Facts and Figures about Europe's Covered Bond Benchmark. Pfandbrief Fact Book, 20th edition, Berlin, 2015.

[162] Verband Deutscher Pfandbriefbanken. The Pfandbrief 2016/2017: Facts and Figures about Europe's Covered Bond Benchmark. Pfandbrief Fact Book, 21th edition, Berlin, 2016.

[163] Verband Deutscher Pfandbriefbanken. Volume outstanding and issuance 2003-2014. Pfandbrief market statistics, 2015.

[164] Verband deutscher Pfandbriefbanken e. V. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[165] Westdeutsche ImmobilienBank AG. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[166] WL BANK AG Westfälische Landschaft Bodenkreditbank. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[167] Wüstenrot Bank AG Pfandbriefbank. Pfandbrief statistics pursuant to §28 Pfandbrief Act, Q4 2014.

[168] R. Zagst. *Interest-Rate Management*. Springer Verlag Berlin Heidelberg, 2002.

[169] C. Zhou. The term structure of credit spreads with jump risk. Journal of Banking & Finance, Vol. 25, No. 11, November 2001, pp. 2015–2040.

Supplementary Tables and Figures

Table A.1: Exemplary bank balance sheet.

t	CPS	CPL	OA	PB	OL
0.5	879	821	5,142	1,700	4,909
1	1,372	—	496	1,054	2,187
1.5	858	—	142	2,155	778
2	1,238	—	142	430	778
2.5	1,082	—	142	309	778
3	1,101	—	142	313	778
3.5	955	—	142	343	778
4	971	—	142	347	778
4.5	872	—	142	572	778
5	887	—	142	579	778
5.5	772	—	919	500	525
6	785	—	919	506	525
6.5	798	—	919	513	525
	810	—	919	520	525
7.5	823	—	919	527	525
8	836	—	919	534	525
8.5	849	—	919	541	525
9	863	—	919	548	525
9.5	876	—	919	555	525
10	890	—	919	563	525
10.5	910	—	919	1,573	525
11	924	—	919	1,594	525
11.5	939	—	919	1,614	525
12	953	—	919	1,636	525
12.5	968	—	919	1,657	525

M. Spangler, *Modelling German Covered Bonds*, Mathematische Optimierung
und Wirtschaftsmathematik | Mathematical Optimization and Economathematics,
https://doi.org/10.1007/978-3-658-23915-2

Table A.2: Exemplary lifetime default probabilities $\pi_R(t)$ for different rating classes $R \in \{AAA, AA, AA, A+, ..., CCC, D\}$ and asset maturities $t \in \{1, 2, 3, ..., 13\}$.

t	π_{AAA}	π_{AA}	π_{A+}	π_{A}	π_{A-}	π_{BBB+}	π_{BBB}	π_{BBB-}
1	0.01%	0.02%	0.03%	0.05%	0.09%	0.12%	0.17%	0.26%
2	0.02%	0.04%	0.06%	0.11%	0.19%	0.26%	0.38%	0.58%
3	0.04%	0.07%	0.10%	0.17%	0.31%	0.44%	0.63%	0.98%
4	0.06%	0.10%	0.14%	0.25%	0.45%	0.65%	0.94%	1.45%
5	0.08%	0.14%	0.19%	0.33%	0.61%	0.89%	1.31%	2.01%
6	0.10%	0.18%	0.24%	0.44%	0.81%	1.19%	1.74%	2.66%
7	0.13%	0.22%	0.30%	0.55%	1.04%	1.53%	2.24%	3.38%
8	0.16%	0.28%	0.37%	0.69%	1.30%	1.92%	2.79%	4.18%
9	0.20%	0.34%	0.46%	0.85%	1.60%	2.35%	3.41%	5.05%
10	0.24%	0.41%	0.55%	1.04%	1.94%	2.84%	4.08%	5.97%
11	0.29%	0.50%	0.66%	1.24%	2.31%	3.37%	4.80%	6.94%
12	0.35%	0.59%	0.79%	1.48%	2.73%	3.94%	5.57%	7.95%
13	0.42%	0.70%	0.93%	1.74%	3.18%	4.55%	6.37%	8.99%

t	π_{BB+}	π_{BB}	π_{BB-}	π_{B+}	π_{B}	π_{B-}	π_{CCC}	π_{D}
1	0.59%	0.88%	1.98%	2.96%	6.67%	10.00%	20.00%	100%
2	1.33%	1.98%	4.37%	6.52%	13.69%	18.78%	32.76%	100%
3	2.23%	3.30%	7.05%	10.32%	20.23%	26.22%	41.51%	100%
4	3.28%	4.80%	9.89%	14.15%	26.05%	32.45%	47.88%	100%
5	4.47%	6.44%	12.79%	17.88%	31.13%	37.68%	52.75%	100%
6	5.78%	8.19%	15.67%	21.44%	35.57%	42.11%	56.63%	100%
7	7.18%	10.00%	18.50%	24.79%	39.45%	45.88%	59.81%	100%
8	8.64%	11.85%	21.22%	27.91%	42.85%	49.14%	62.47%	100%
9	10.15%	13.71%	23.82%	30.82%	45.86%	51.98%	64.75%	100%
10	11.69%	15.56%	26.29%	33.51%	48.54%	54.47%	66.73%	100%
11	13.24%	17.39%	28.64%	36.01%	50.94%	56.69%	68.46%	100%
12	14.79%	19.19%	30.85%	38.33%	53.09%	58.67%	70.00%	100%
13	16.33%	20.94%	32.94%	40.48%	55.05%	60.46%	71.37%	100%

Table A.3: Calibrated model parameters $\hat{Z}_i^{x,0}$, $\hat{\mu}_i^x$ and $\hat{\sigma}_i^x$ for $i = 1, ..., n_x$ and $x \in \{CPS, OA\}$, based on the Vasicek parameters in Table 5.9 and the correlations in Table 5.5.

t	$\hat{Z}_i^{CPS,0}$	$\hat{\mu}_i^{CPS}$	$\hat{\sigma}_i^{CPS}$	$\hat{Z}_i^{OA,0}$	$\hat{\mu}_i^{OA}$	$\hat{\sigma}_i^{OA}$
0.5	2.0411	0.0030	0.3514	3718.0747	0.0028	3.0381
1	1.8418	0.0036	0.2332	1189.3540	0.0036	2.0107
1.5	1.7129	0.0041	0.1812	538.0490	0.0041	1.5589
2	1.6300	0.0045	0.1513	316.8214	0.0047	1.3000
2.5	1.5586	0.0049	0.1308	197.5797	0.0051	1.1213
3	1.5042	0.0052	0.1160	137.2294	0.0055	0.9935
3.5	1.4542	0.0055	0.1044	97.4509	0.0059	0.8929
4	1.4132	0.0058	0.0953	73.5089	0.0063	0.8140
4.5	1.3748	0.0061	0.0877	56.2259	0.0066	0.7478
5	1.3419	0.0063	0.0814	44.6908	0.0069	0.6932
5.5	1.3108	0.0065	0.0759	35.9184	0.0072	0.6459
6	1.2834	0.0067	0.0713	29.6324	0.0075	0.6055
6.5	1.2575	0.0069	0.0671	24.6829	0.0078	0.5697
7	1.2341	0.0071	0.0635	20.9447	0.0081	0.5384
7.5	1.2120	0.0072	0.0603	17.9251	0.0083	0.5103
8	1.1917	0.0074	0.0574	15.5497	0.0086	0.4852
8.5	1.1726	0.0075	0.0547	13.5920	0.0089	0.4625
9	1.1549	0.0076	0.0524	12.0014	0.0091	0.4420
9.5	1.1381	0.0077	0.0502	10.6685	0.0094	0.4232
10	1.1224	0.0078	0.0482	9.5568	0.0096	0.4061
10.5	1.1076	0.0078	0.0464	8.6122	0.0099	0.3903
11	1.0936	0.0079	0.0447	7.8070	0.0101	0.3758
11.5	1.0804	0.0079	0.0431	7.1145	0.0104	0.3623
12	1.0679	0.0080	0.0417	6.5136	0.0106	0.3498
12.5	1.0560	0.0080	0.0403	5.9912	0.0108	0.3382

Table A.4: Base run default statistics.

t	π^B_t	$\pi^B_{t,cum}$	L^{OL}_t	EL^{OL}_t	$EL^{OL}_{t,cum}$	π^P_t	$\pi^P_{t,cum}$	L^{PB}_t	EL^{PB}_t	$EL^{PB}_{t,cum}$
0.5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1	0.0%	0.0%	68.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1.5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2.5	0.0%	0.0%	95.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3	0.0%	0.0%	94.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3.5	0.0%	0.0%	94.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4	0.1%	0.1%	94.2%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
4.5	0.2%	0.3%	90.9%	0.2%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%
5	0.5%	0.7%	90.5%	0.4%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%
5.5	0.4%	1.2%	92.0%	0.4%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%
6	0.5%	1.6%	92.1%	0.4%	1.5%	0.0%	0.0%	0.0%	0.0%	0.0%
6.5	0.5%	2.1%	91.6%	0.5%	1.9%	0.0%	0.0%	0.0%	0.0%	0.0%
7	0.6%	2.7%	91.2%	0.5%	2.4%	0.0%	0.0%	0.0%	0.0%	0.0%
7.5	0.6%	3.2%	91.2%	0.5%	3.0%	0.0%	0.0%	0.0%	0.0%	0.0%
8	0.5%	3.8%	90.7%	0.5%	3.4%	0.0%	0.0%	0.0%	0.0%	0.0%
8.5	0.5%	4.3%	90.6%	0.5%	3.9%	0.0%	0.0%	0.0%	0.0%	0.0%
9	0.6%	4.9%	89.8%	0.5%	4.5%	0.0%	0.0%	50.5%	0.0%	0.0%
9.5	0.6%	5.5%	88.7%	0.5%	5.0%	0.0%	0.0%	45.7%	0.0%	0.0%
10	0.6%	6.1%	87.2%	0.5%	5.5%	0.1%	0.1%	38.1%	0.0%	0.0%
10.5	0.8%	6.9%	86.0%	0.7%	6.2%	0.8%	0.9%	28.1%	0.2%	0.2%
11	1.0%	7.9%	79.0%	0.8%	7.0%	1.9%	2.8%	24.4%	0.5%	0.7%
11.5	1.3%	9.2%	67.2%	0.9%	7.9%	2.5%	5.3%	18.8%	0.5%	1.2%
12	1.0%	10.2%	49.3%	0.5%	8.4%	2.1%	7.4%	11.9%	0.2%	1.4%
12.5	0.2%	10.4%	15.8%	0.0%	8.4%	0.2%	7.6%	1.5%	0.0%	1.4%
min	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
max	1.3%	10.4%	95.2%	0.9%	8.4%	2.5%	7.6%	50.5%	0.5%	1.4%

Table A.5: Base run default timing: number of default events by simulation time ('# D' = total number of bank defaults, '# S' = number of simultaneous cover pool defaults, '# L' = number of later cover pool defaults, '# N' = number of no cover pool defaults in case of bank default).

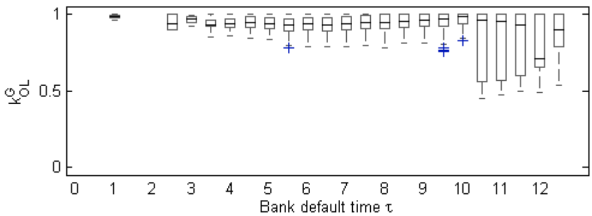
t	# D	# S	# L	# N
0.5	0	0	0	0
1	15	0	0	15
1.5	0	0	0	0
2	0	0	0	0
2.5	6	0	2	4
3	4	0	1	3
3.5	20	0	5	15
4	61	0	38	23
4.5	170	0	129	41
5	451	0	338	113
5.5	444	0	338	106
6	451	0	327	124
6.5	505	0	378	127
7	550	0	405	145
7.5	554	0	392	162
8	538	0	383	155
8.5	538	0	386	152
9	594	0	454	140
9.5	602	0	443	159
10	602	0	452	150
10.5	788	259	365	164
11	1008	411	377	220
11.5	1316	638	325	353
12	1006	594	22	390
12.5	225	152	0	73
Total	10448	2054	5560	2834
%	100%	20%	53%	27%

Table A.6: Base run PD-ratings.

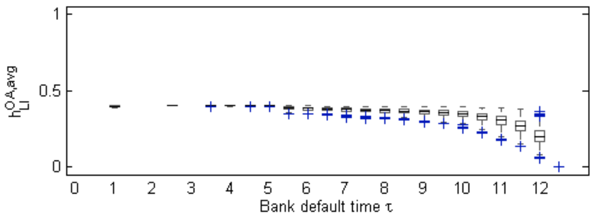
$\boldsymbol{t}$	$\boldsymbol{OL}$	$\boldsymbol{PB}$
0.5	AAA	AAA
1	AA	AAA
1.5	AAA	AAA
2	AAA	AAA
2.5	AAA	AAA
3	AAA	AAA
3.5	AAA	AAA
4	A+	AAA
4.5	A	AAA
5	BBB+	AAA
5.5	BBB	AAA
6	BBB	AAA
6.5	BBB-	AAA
7	BBB-	AAA
7.5	BBB-	AAA
8	BBB-	AAA
8.5	BBB-	AAA
9	BBB-	AAA
9.5	BBB-	AAA
10	BB+	AAA
10.5	BB+	A
11	BB+	BBB+
11.5	BB+	BBB-
12	BB+	BBB-
12.5	BB+	BBB-

Table A.7: Base run default reasons over time ('# D-B' = total number of bank defaults, '# O-B' = number of bank defaults triggered by overindebtedness, '# I-B' = number of bank defaults triggered by illiquidity, '# D-P' = total number of cover pool defaults, '# O-P' = number of cover pool defaults triggered by overindebtedness, '# I-P' = number of cover pool defaults triggered by illiquidity).

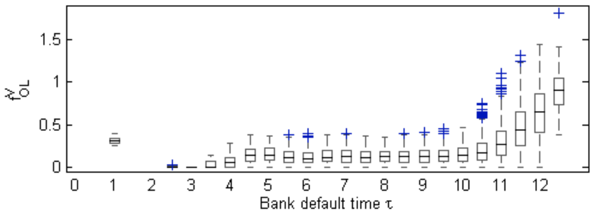
t	# D-B	# O-B	# I-B	# D-P	# O-P	# I-P
0.5	0	0	0	0	0	0
1	15	0	15	0	0	0
1.5	0	0	0	0	0	0
2	0	0	0	0	0	0
2.5	6	0	6	0	0	0
3	4	0	4	0	0	0
3.5	20	0	20	0	0	0
4	61	7	54	0	0	0
4.5	170	5	165	0	0	0
5	451	1	450	0	0	0
5.5	444	1	443	0	0	0
6	451	2	449	0	0	0
6.5	505	1	504	0	0	0
7	550	1	549	0	0	0
7.5	554	0	554	0	0	0
8	538	0	538	0	0	0
8.5	538	0	538	0	0	0
9	594	3	591	2	2	0
9.5	602	26	576	10	10	0
10	602	88	514	71	71	0
10.5	788	442	346	771	530	241
11	1008	911	97	1942	1537	405
11.5	1316	1313	3	2482	2233	249
12	1006	1006	0	2091	2087	4
12.5	225	225	0	245	245	0
Total	10448	4032	6416	7614	6715	899
%	100%	39%	61%	100%	88%	12%



(a) $k^{G}_{OL}(\tau)$.

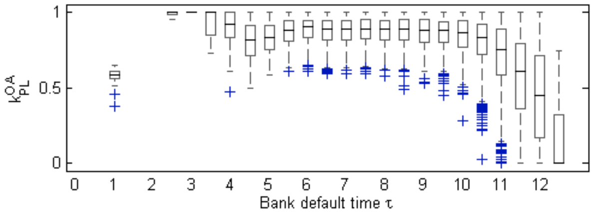


(b) $h^{OA,avg}_{LI}(\tau)$.

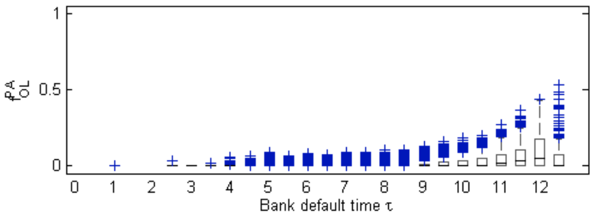


(c) $f^{V}_{OL}(\tau)$.

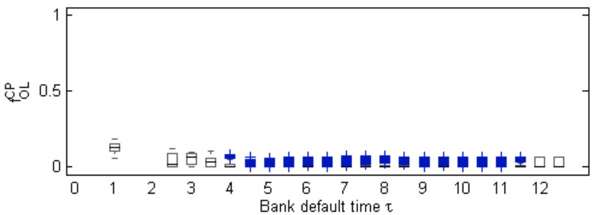
Figure A.1: (part 1) Base run distribution of loss drivers of other liabilities (central mark of boxes: median, edges of boxes: 25th and 75th percentiles).



(d) $k^{OA}_{PL}(\tau - \Delta)$.



(e) $f^{PA}_{OL}(\tau)$.



(f) $f^{CP}_{OL}(\tau)$.

Figure A.1: (part 2) Base run distribution of loss drivers of other liabilities (central mark of boxes: median, edges of boxes: 25th and 75th percentiles).

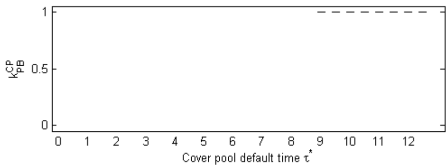
Table A.8: Base run scenarios with the ten highest/lowest losses of other liabilities.

(a) The ten highest losses of other liabilities.

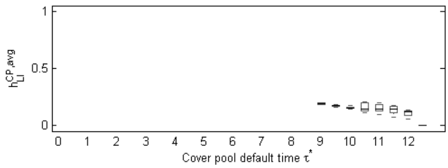
No.	$LS^{OL}(\tau)$	τ	$\frac{V_B^O(\tau)}{B_R^O(\tau)}$	τ^*	$k_{OL}^G(\tau)$	$h_{LI}^{OA,avg}(\tau)$	$k_{PL}^{OA}(\tau-\Delta)$	$f_{OL}^V(\tau)$	$f_{OL}^{PA}(\tau)$	$f_{OL}^{CP}(\tau)$
1	100%	4	< 1	11	86%	n/a	100%	0%	0%	0%
2	100%	2.5	≥ 1	12	100%	n/a	100%	0%	0%	0%
3	100%	2.5	≥ 1	11.5	95%	n/a	100%	0%	0%	0%
4	100%	4	< 1	10	89%	n/a	100%	0%	0%	0%
5	100%	4	≥ 1	11	96%	n/a	100%	0%	0%	0%
6	100%	4	≥ 1	11.5	99%	n/a	100%	0%	0%	0%
7	100%	4	≥ 1	10.5	91%	n/a	100%	0%	0%	0%
8	100%	3	≥ 1	11.5	99%	n/a	100%	0%	0%	0%
9	100%	4	≥ 1	11	95%	n/a	100%	0%	0%	0%
10	100%	4	< 1	10.5	88%	n/a	100%	0%	0%	0%
min	100%	2.5	—	10	86%	n/a	100%	0%	0%	0%
max	100%	4.0	—	12	100%	n/a	100%	0%	0%	0%

(b) The ten lowest losses of other liabilities.

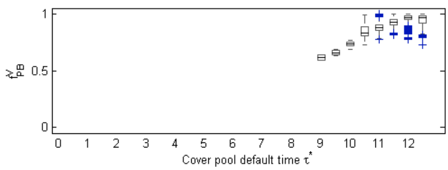
No.	$LS^{OL}(\tau)$	τ	$\frac{V_B^O(\tau)}{B_R^O(\tau)}$	τ^*	$k_{OL}^G(\tau)$	$h_{LI}^{OA,avg}(\tau)$	$k_{PL}^{OA}(\tau-\Delta)$	$f_{OL}^V(\tau)$	$f_{OL}^{PA}(\tau)$	$f_{OL}^{CP}(\tau)$
1	0.2%	12.5	< 1	∞	100%	0%	25%	84%	10%	6%
2	0.2%	12.5	< 1	12.5	91%	0%	38%	90%	18%	0%
3	0.2%	12.5	< 1	12.5	95%	0%	5%	103%	2%	0%
4	0.3%	12.5	< 1	12.5	74%	0%	0%	135%	0%	0%
5	0.5%	12.5	< 1	∞	100%	0%	6%	96%	2%	1%
6	0.6%	12.5	< 1	12.5	88%	0%	9%	109%	3%	0%
7	0.7%	12.5	< 1	∞	100%	0%	72%	46%	48%	4%
8	0.9%	12.5	< 1	∞	100%	0%	13%	88%	5%	6%
9	1.1%	12.5	< 1	12.5	80%	0%	0%	124%	0%	0%
10	1.1%	12.5	< 1	∞	100%	0%	0%	93%	0%	6%
min	0.2%	12.5	—	12.5	74%	0%	0%	46%	0%	0%
max	1.1%	12.5	—	∞	100%	0%	72%	135%	48%	6%



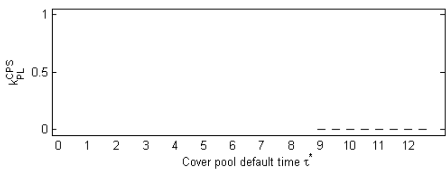
(a) $k_{PB}^{CP}(\tau^*)$.



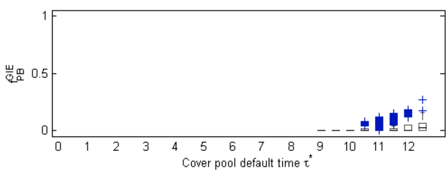
(b) $h_{LI}^{CP,avg}(\tau^*)$.



(c) $f_{PB}^{V}(\tau^*)$.



(d) $k_{PL}^{CPS}(\tau^* - \Delta)$.



(e) $f_{PB}^{GIE}(\tau^*)$.

Figure A.2: Base run distribution of Pfandbrief loss drivers (central mark of boxes: median, edges of boxes: 25th and 75th percentiles).

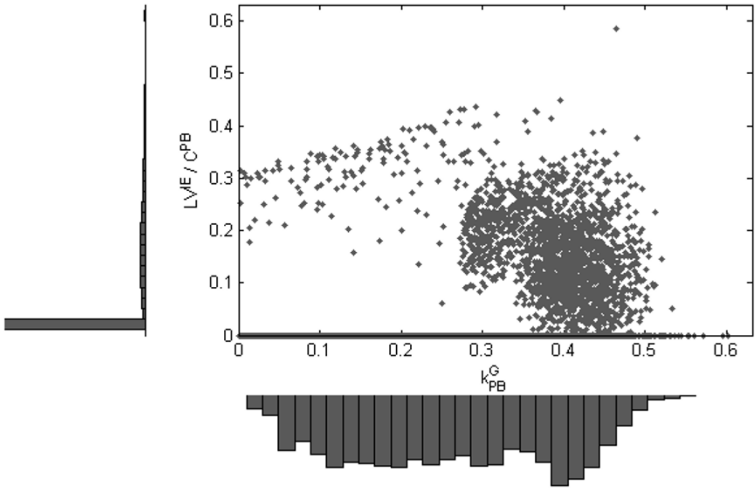


Figure A.3: Bivariate distribution of $k_{PB}^{G}(\tau^*)$ and $\frac{LV^{IE}(\tau^*)}{C^{PB}(\tau^*)}$ in the base run.

Table A.9: Base run scenarios with the ten highest/lowest losses of Pfandbriefe.

(a) The ten highest Pfandbrief losses.

No.	$LS^{PB}(\tau^*)$	τ^*	$\frac{V_P^O(\tau^*)}{B_P^O(\tau^*)}$	τ	$h_{LI}^{CP,avg}(\tau^*)$	$k_{PL}^{CPS}(\tau^* - \Delta)$	$f_{PB}^V(\tau^*)$	$f_{PB}^{GIE}(\tau^*)$
1	52.8%	9	< 1	5.5	20%	0%	59%	0%
2	48.2%	9.5	< 1	5	18%	0%	63%	0%
3	48.2%	9.5	< 1	5	18%	0%	63%	0%
4	48.1%	9	< 1	5	19%	0%	64%	0%
5	47.2%	9.5	< 1	5	17%	0%	64%	0%
6	46.3%	9.5	< 1	5	16%	0%	64%	0%
7	46.3%	9.5	< 1	4.5	17%	0%	65%	0%
8	45.6%	9.5	< 1	4	17%	0%	66%	0%
9	45.1%	9.5	< 1	5	18%	0%	67%	0%
10	44.0%	9.5	< 1	4.5	18%	0%	68%	0%
min	44.0%	9	—	4	16%	0%	59%	0%
max	52.8%	9.5	—	5.5	20%	0%	68%	0%

(b) The ten lowest Pfandbrief losses.

No.	$LS^{PB}(\tau^*)$	τ^*	$\frac{V_P^O(\tau^*)}{B_P^O(\tau^*)}$	τ	$h_{LI}^{CP,avg}(\tau^*)$	$k_{PL}^{CPS}(\tau^* - \Delta)$	$f_{PB}^V(\tau^*)$	$f_{PB}^{GIE}(\tau^*)$
1	0.001%	12.5	< 1	12.5	0%	0%	99.9%	0%
2	0.004%	12.5	< 1	12.5	0%	0%	98.4%	2%
3	0.005%	12.5	< 1	12.5	0%	0%	96.9%	3%
4	0.007%	12.5	< 1	12.5	0%	0%	99.7%	0%
5	0.015%	12.5	< 1	12.5	0%	0%	99.9%	0%
6	0.016%	12.5	< 1	12.5	0%	0%	99.7%	0%
7	0.024%	12.5	< 1	12.5	0%	0%	95.7%	4%
8	0.032%	12.5	< 1	12.5	0%	0%	99.5%	0%
9	0.033%	12.5	< 1	12.5	0%	0%	99.7%	0%
10	0.034%	12.5	< 1	12.5	0%	0%	99.3%	1%
min	0.001%	12.5	—	12.5	0%	0%	95.7%	0%
max	0.034%	12.5	—	12.5	0%	0%	99.9%	4%

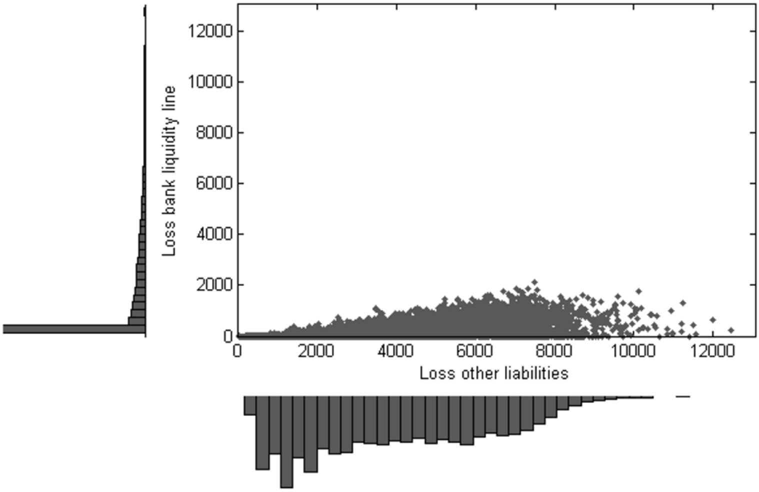
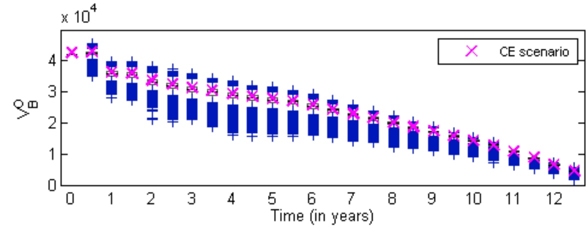
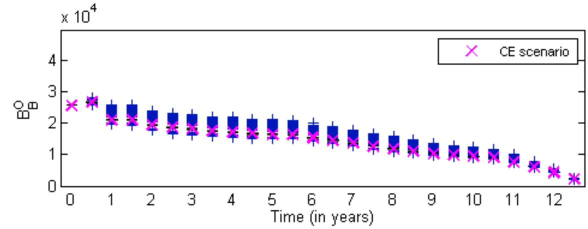


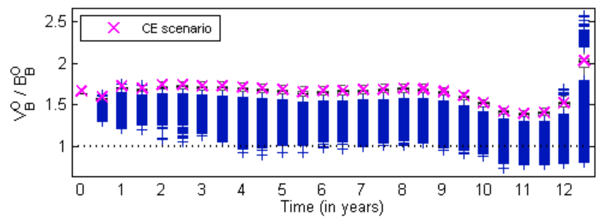
Figure A.4: Bivariate loss distribution of other liabilities and the bank's liquidity line in the base run.



(a) Value of the bank's assets, $V_B^O(t)$.

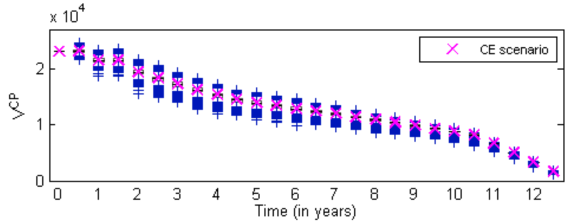


(b) Bank default barrier, $B_B^O(t)$.

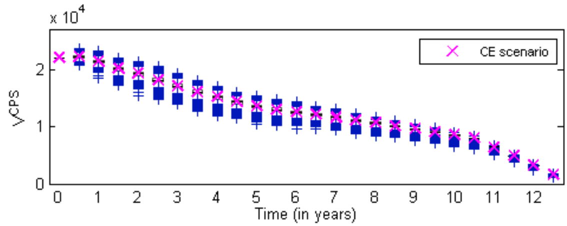


(c) Value of the bank's assets vs. bank default barrier, $\frac{V_B^O(t)}{B_B^O(t)}$.

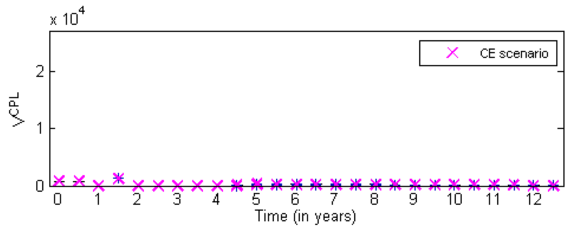
Figure A.5: The bank's solvency situation in the base run, given that the bank has not defaulted prior to the respective time (central mark of boxes: median, edges of boxes: 25th and 75th percentiles).



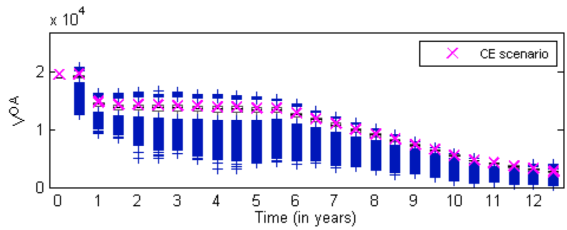
(a) Cover pool value, $V^{CP}(t)$.



(b) Value of strategic cover pool assets, $V^{CPS}(t)$.

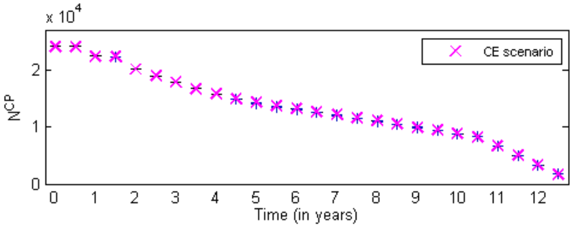


(c) Value of liquid cover pool assets, $V^{CPL}(t)$.

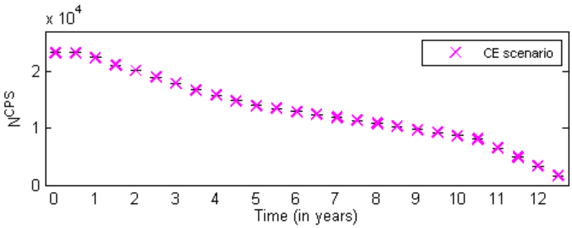


(d) Value of other assets, $V^{OA}(t)$.

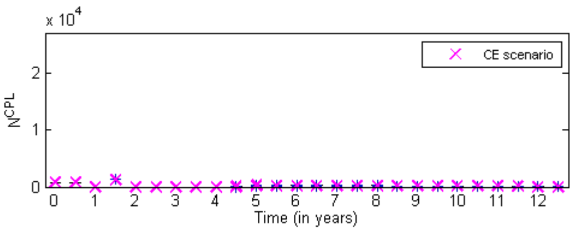
Figure A.6: Distribution of asset present values in the base run, given that the bank has not defaulted prior to the respective time (central mark of boxes: median, edges of boxes: 25th and 75th percentiles).



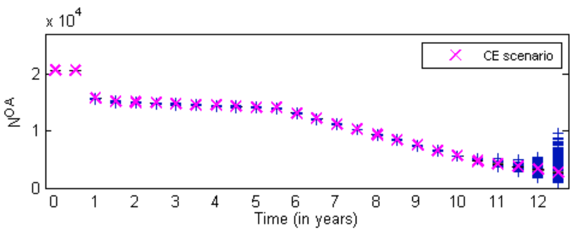
(a) Cover pool nominal, $N^{CP}(t)$.



(b) Nominal of strategic cover pool assets, $N^{CPS}(t)$.

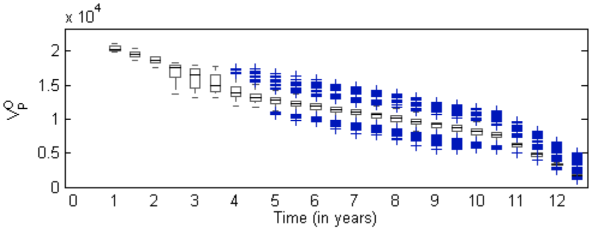


(c) Nominal of liquid cover pool assets, $N^{CPL}(t)$.

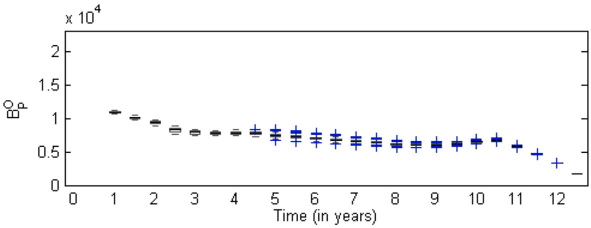


(d) Nominal of other assets, $N^{OA}(t)$.

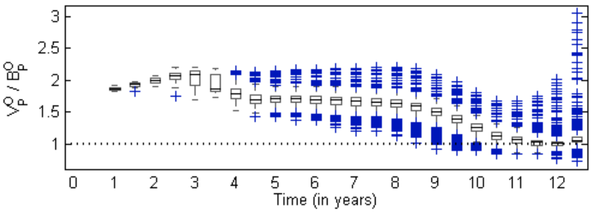
Figure A.7: Distribution of asset nominals in the base run, given that the bank has not defaulted prior to the respective time (central mark of boxes: median, edges of boxes: 25th and 75th percentiles).



(a) Cover pool value, $V_P^O(t)$.

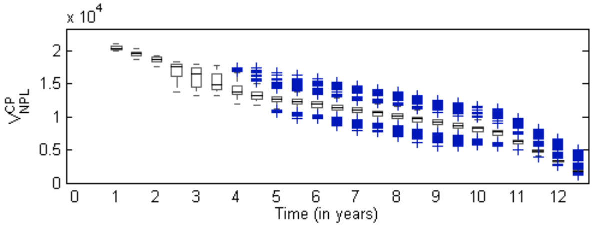


(b) Cover pool default barrier, $B_P^O(t)$.

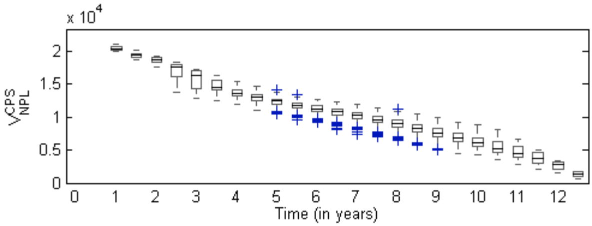


(c) Cover pool value vs. cover pool default barrier, $\frac{V_P^O(t)}{B_P^O(t)}$.

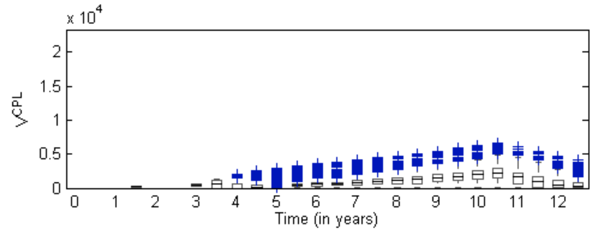
Figure A.8: The cover pool's solvency situation in the base run, given that the bank has already defaulted but the cover pool has not defaulted prior to the respective time (central mark of boxes: median, edges of boxes: 25th and 75th percentiles).



(a) Cover pool value, $V_{NPL}^{CP}(t)$.

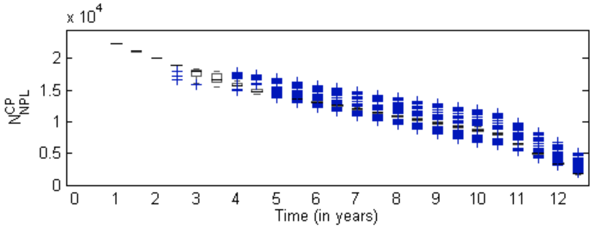


(b) Value of strategic cover pool assets, $V_{NPL}^{CPS}(t)$.

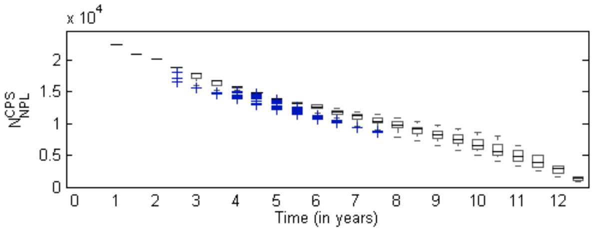


(c) Value of liquid cover pool assets, $V^{CPL}(t)$.

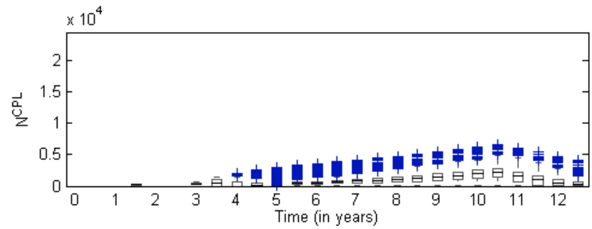
Figure A.9: Distribution of cover pool present values in the base run, given that the bank has already defaulted but the cover pool has not defaulted prior to the respective time (central mark of boxes: median, edges of boxes: 25th and 75th percentiles).



(a) Cover pool nominal, $N^{CP}_{NPL}(t)$.

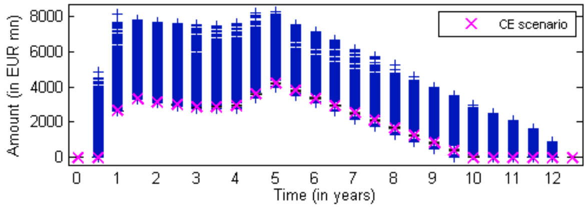


(b) Nominal of strategic cover pool assets, $N^{CPS}_{NPL}(t)$.

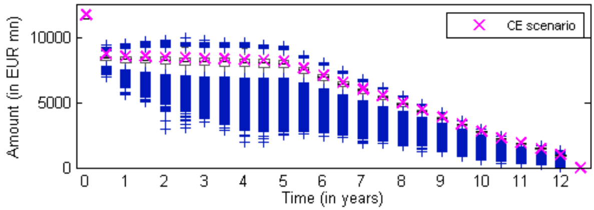


(c) Nominal of liquid cover pool assets, $N^{CPL}(t)$.

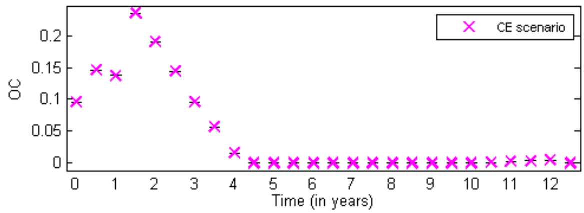
Figure A.10: Distribution of cover pool nominals in the base run, given that the bank has already defaulted but the cover pool has not defaulted prior to the respective time (central mark of boxes: median, edges of boxes: 25th and 75th percentiles).



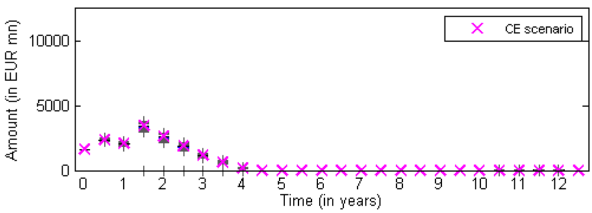
(a) The bank's funding need, $G_B^C(t)$.



(b) Potential funding from other assets, $L_{OA}^{\max}(t)$.

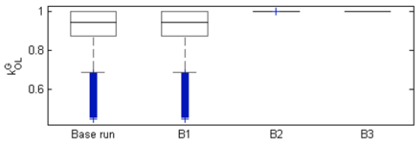


(c) Percentage nominal overcollateralization, $\frac{\tilde{N}^{CPS}(t)-\tilde{N}^{PB}(t)}{\tilde{N}^{PB}(t)}$.

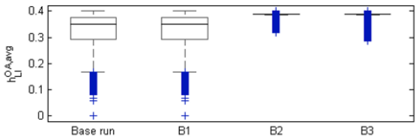


(d) Potential funding from strategic cover pool assets, $L_{CPS}^{\max}(t)$.

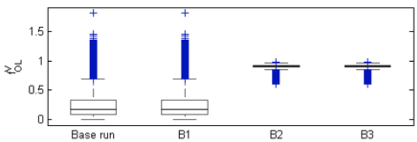
Figure A.11: The bank's funding situation in the base run, given that the bank has not defaulted prior to the respective time (central mark of boxes: median, edges of boxes: 25th and 75th percentiles).



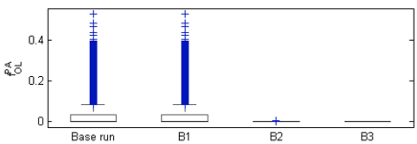
(a) $k^{G}_{OL}(\tau)$.



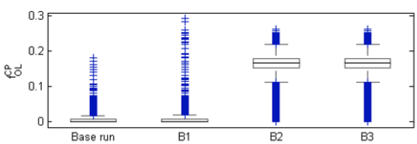
(b) $h^{OA,avg}_{LI}(\tau)$.



(c) $f^{V}_{OL}(\tau)$.

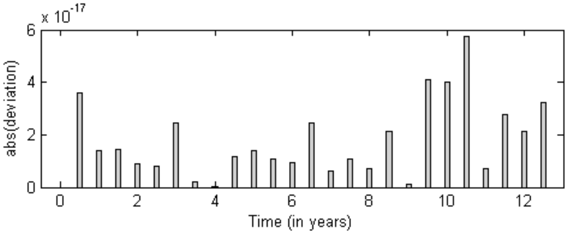


(d) $f^{PA}_{OL}(\tau)$.

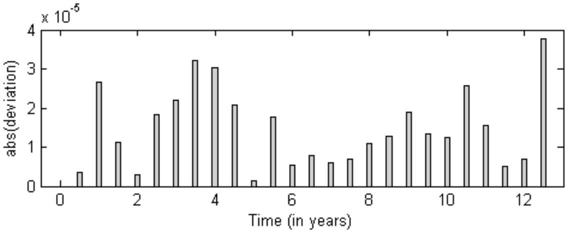


(e) $f^{CP}_{OL}(\tau)$.

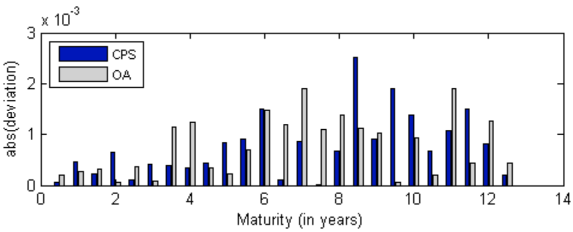
Figure A.12: Bank funding scenario analysis: distribution of loss drivers of other liabilities (central mark of boxes: median, edges of boxes: 25th and 75th percentiles).



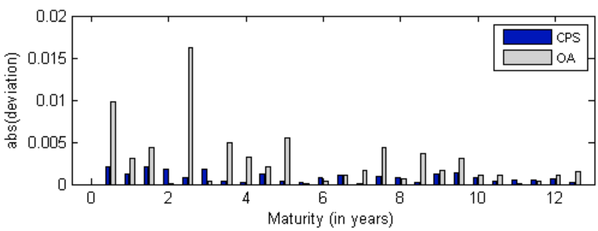
(a) Short rate mean $\mu_{r(t)|\mathcal{F}_0}$: model vs. realized.



(b) Short rate volatility $\sigma_{r(t)|\mathcal{F}_0}$: model vs. realized.

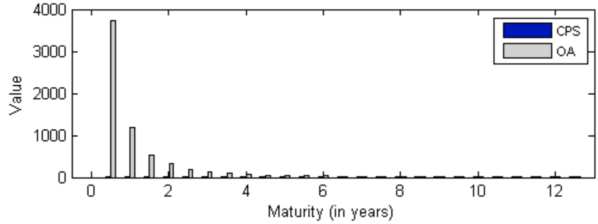


(c) Asset PDs π_i^{CPS} and π_j^{OA}: model vs. realized.

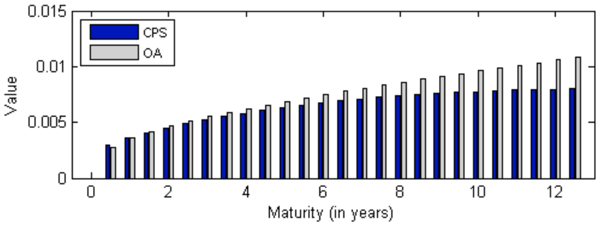


(d) Asset LGDs $Ł_i^{CPS}$ and $Ł_j^{OA}$: model vs. realized.

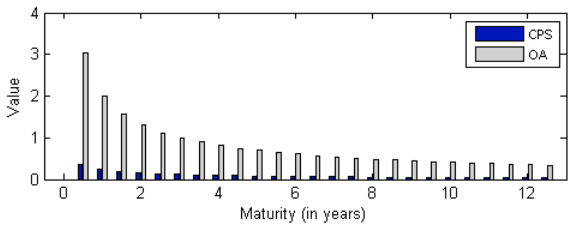
Figure A.13: Absolute deviations of realized statistics from their theoretical counterparts in the base run, by time bucket.



(a) Comparison of $Z_k^{x,0}$, $x \in \{CPS, OA\}$.



(b) Comparison of μ_k^x, $x \in \{CPS, OA\}$.



(c) Comparison of σ_k^x, $x \in \{CPS, OA\}$.

Figure A.14: State variable process parameters in the base run.