

Econometric approach to assess the transfer value of professional football players

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Transfer value

The most likely fee that an engaging team should pay to the releasing club as compensation for breaching the contract of the player wished with respect to the indemnities paid in the past for players with similar characteristics

Transfer fees

Many cases

- Add-ons (more or less easy to activate) ?
- Loans with option/obligation to buy ?
- Activation of buy-out clauses ?
- Player exchanges ?
- Co-ownerships or purchase of shares ?
- Etc.

Source of information

Transfer fees, details of contracts or salaries are rarely public.

The Cross-checking of various sources of information is necessary: medias, specialized websites about transfer market (tuttomercatoweb, footmercato, transfermarkt, etc.), Wikipedia, Fanclubs, forum, direct interviews, etc.

There are still uncertainties even in the case of the most well-known players

AGREEMENT WITH REAL MADRID FOR THE DEFINITIVE ACQUISITION OF THE PLAYER CRISTIANO RONALDO

Turin, 10 July 2018 - Juventus Football Club S.p.A. announces that the agreement with Real Madrid Club De Fútbol S.p.A. for the definitive acquisition of the registration rights of the player Dos Santos Aveiro Cristiano Ronaldo has been reached for a consideration of **€ 100 million** payable in 2 financial years, in addition to the solidarity contribution provided by FIFA regulations and **additional costs of € 12 million.**

Juventus and the player have signed a **4-year contract of employment until 30 June 2022.**

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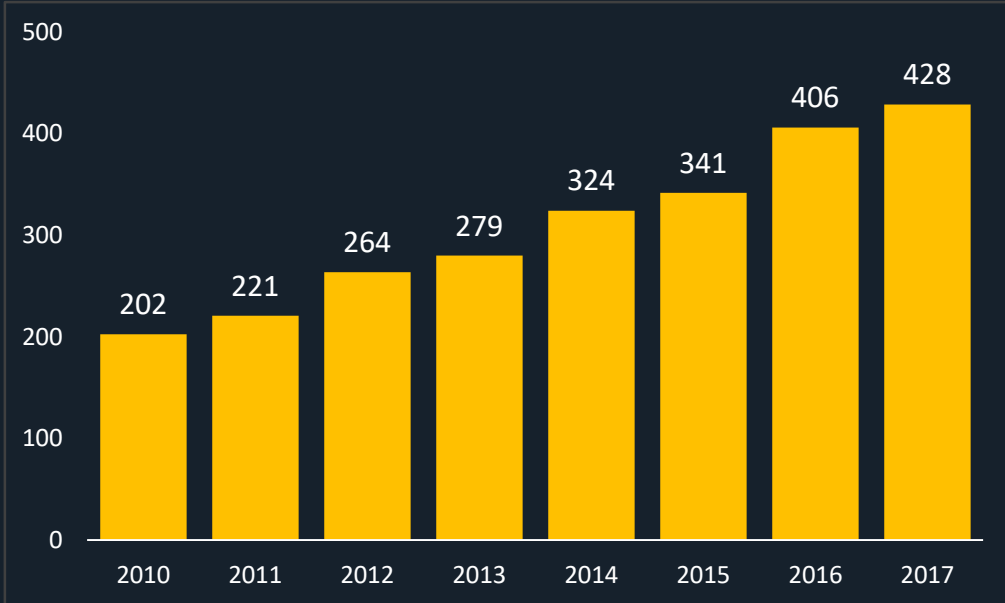
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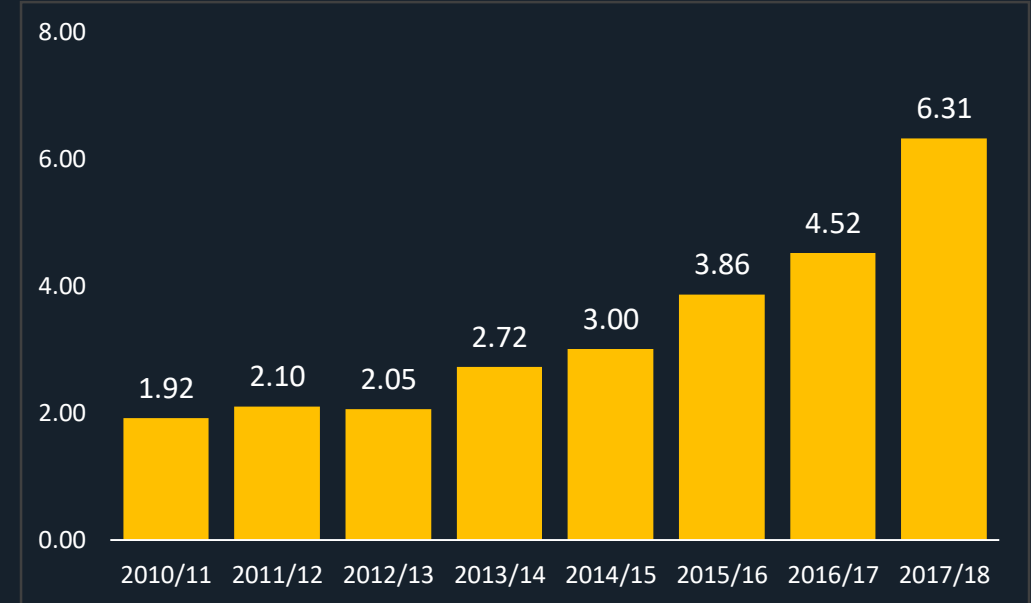
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An inflationary context



Average revenues of top 10 richest clubs (million €)

Source: Deloitte



Amounts generated by transfers from big-5 clubs (billion €)

Source: CIES Football Observatory

Method and sample

1771 paying transfers from big-5 league clubs (Premier League, Liga, Ligue 1, Bundesliga, Serie A) between summer 2011 and winter 2019

- Transfer fees including add-ons
- Activation of buy-out clauses not taken into account

Hedonic models

Multivariate regression analysis

Explanatory variables

(1) Player's contractual situation

Length of contract and book value

(2) Demographic profile of the player

Age and position

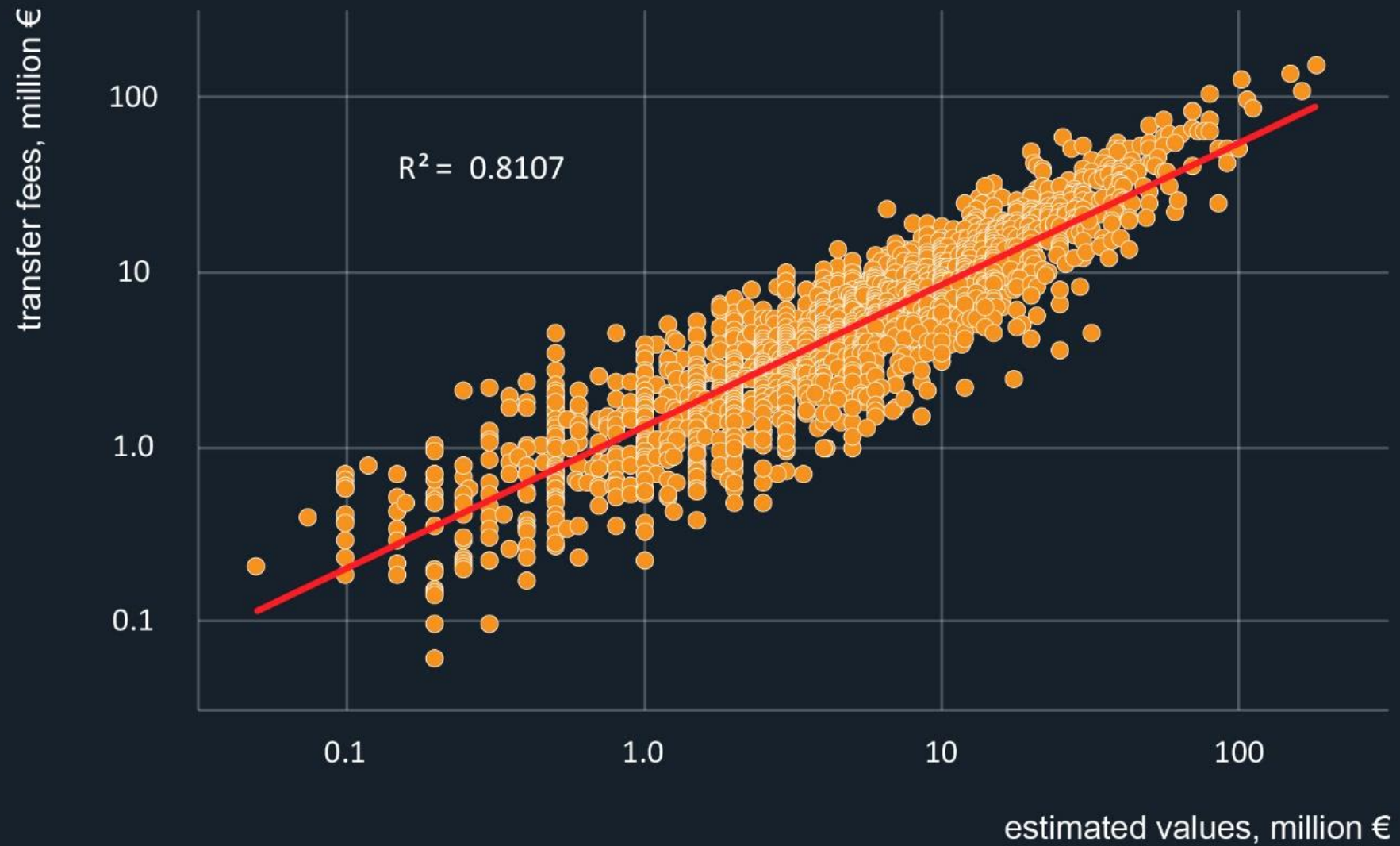
(3) Player performances

Experience index, minutes played , goals and dribbles, international activity

(4) Economic and sporting status of the clubs

Seller and buyer financial strength, seller clubs past results

(5) Inflation



Unusual and influential data

Player	Transfer	Cooks'D	Evaluation	Reported	Gap
Morgan De Sanctis	SSC Napoli ->AS Roma (2013)	0.0135	4.6	0.5	-4.1
Diego Alves	Valencia CF ->Clube de Regatas do Flamengo (2017)	0.0105	3.5	0.5	-3.0
Raffaele Palladino	FC Crotone ->FC Genoa 1893 (2017)	0.0097	2.1	0.3	-1.9
Federico Marchetti	Cagliari Calcio ->SS Lazio (2011)	0.0095	1.3	5.6	4.3
Alexander Brunst-Zöllner	Hamburger SV ->VfL Wolfsburg (2015)	0.0084	1.0	0.2	-0.8
Marlon Ritter	VfL Borussia Mönchengladbach ->Fortuna Düsseldorf (2011)	0.0082	0.6	0.1	-0.5
Jacopo Sala	Hamburger SV ->Hellas Verona FC (2013)	0.0080	0.7	0.1	-0.6
Joseph-Claude Gyau	TSG 1899 Hoffenheim ->BV 09 Borussia Dortmund (2014)	0.0078	0.8	0.1	-0.7
Yohandry Orozco	VfL Wolfsburg ->Deportivo Táchira FC (2013)	0.0078	0.7	0.1	-0.6
Pietro Pellegri	FC Genoa 1893 ->AS Monaco (2018)	0.0077	3.6	25.0	21.4
Saido Berahino	West Bromwich Albion FC ->Stoke City FC (2017)	0.0073	2.5	17.4	14.9
Felix Bastians	SC Freiburg ->Hertha BSC Berlin (2012)	0.0070	0.6	0.1	-0.5
Godfred Donsah	Hellas Verona FC ->Cagliari Calcio (2014)	0.0069	0.5	2.5	2.0
Marvin Bakalorz	BV 09 Borussia Dortmund ->Eintracht Frankfurt (2013)	0.0069	0.4	0.1	-0.3
Ramires	Chelsea FC ->Jiangsu Suning FC (2016)	0.0069	4.5	31.7	27.2
Jordi Figueras	Rayo Vallecano de Madrid ->Real Betis Balompié (2013)	0.0065	2.2	0.3	-1.9
Connor Goldson	Brighton & Hove Albion FC ->Rangers FC (2018)	0.0065	0.7	3.4	2.7
Willem Geubbels	Olympique Lyonnais ->AS Monaco (2018)	0.0063	4.2	20.0	15.8
Florian Trinks	SV Werder Bremen ->SpVgg Greuther Fürth (2013)	0.0059	0.2	0.1	-0.2
Michael Hefele	Huddersfield Town FC ->Nottingham Forest FC (2018)	0.0058	1.8	0.4	-1.4

Outliers: principle concerns

Issues with data:

- High uncertainty concerning some transfer fees, contractual status or book values
- For some small transfer fees, unknown agreements (% on the following transfers)
- Unknown buy-out clauses

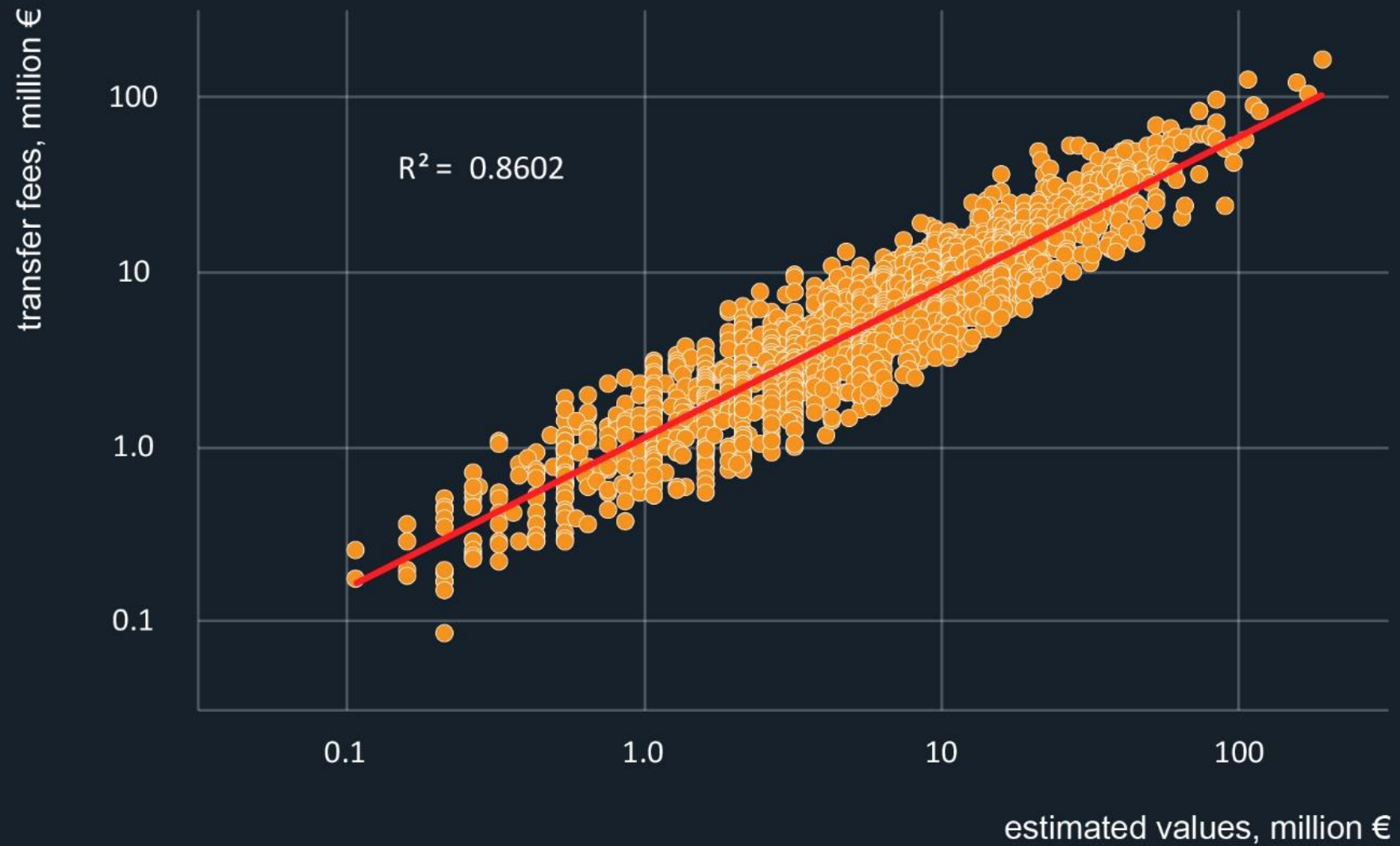
Suspicious cases and illegal behaviours

Transfers to emerging clubs (underestimated financial strength)

Conflicts between players and clubs/managers

Very young players without prior activity

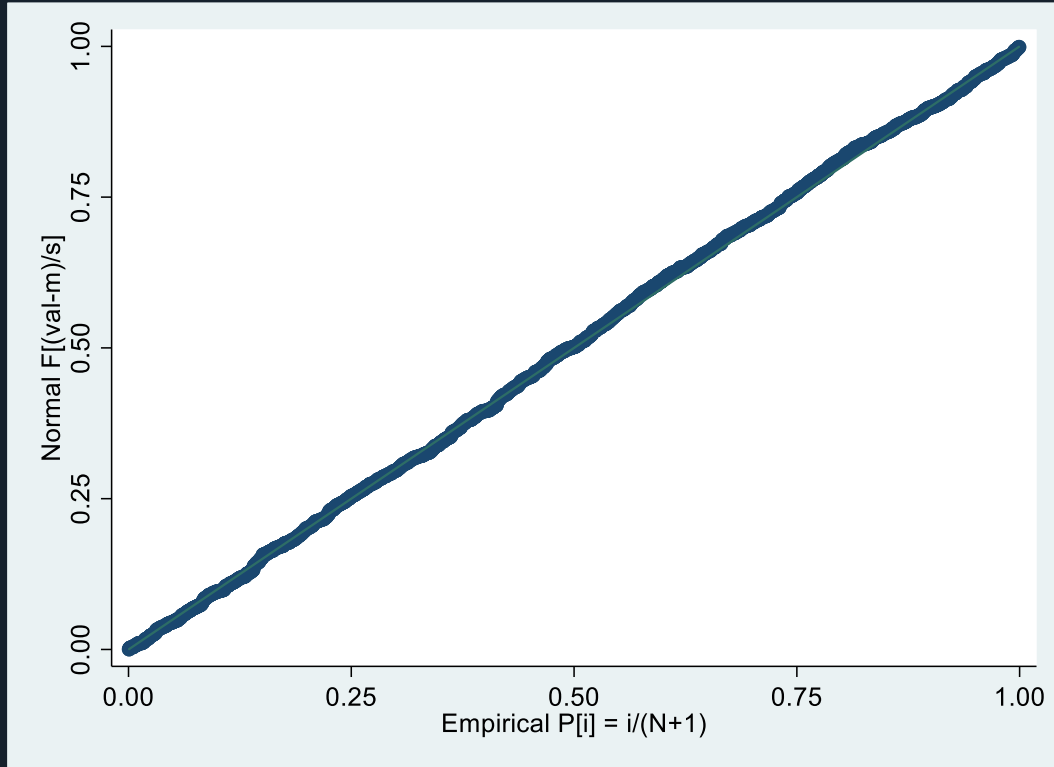
Etc.



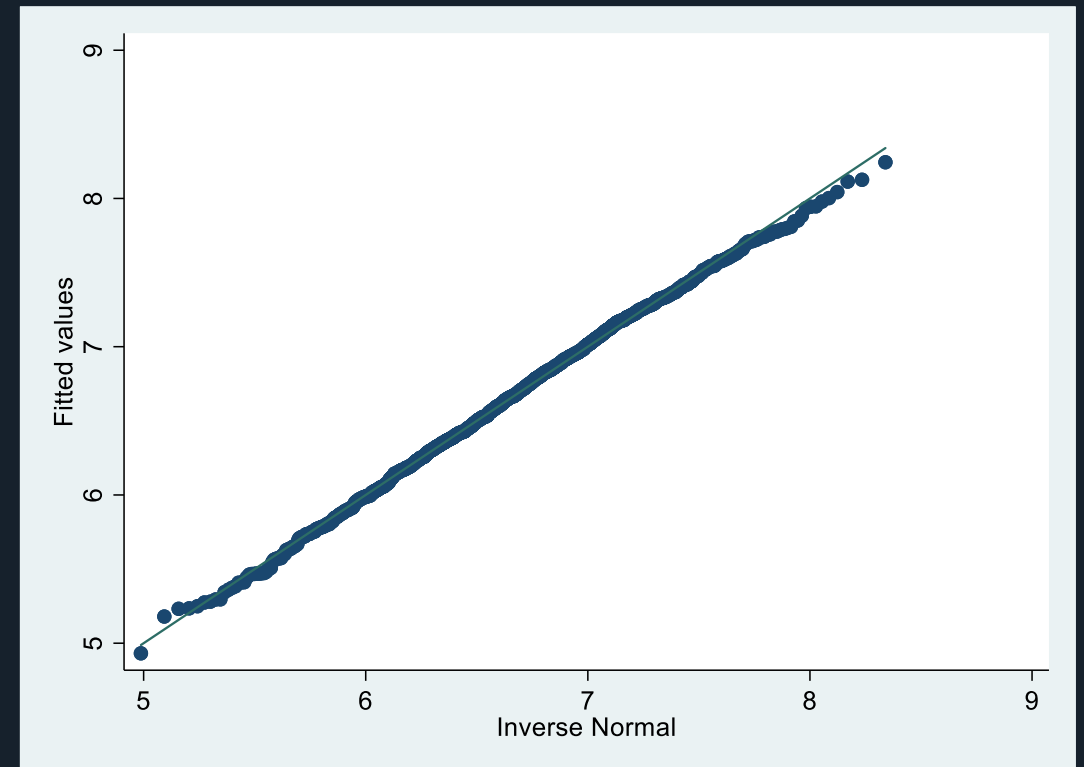
	variable	coef	t	p	
contract	contr01	-0.336	-10.760	0.000	***
	contr03	0.152	10.940	0.000	***
	contr04	0.178	11.340	0.000	***
	contr05	0.240	12.400	0.000	***
	book_value	0.047	5.450	0.000	***
clubs	buyer_finance	0.906	26.830	0.000	***
	seller_results	0.175	6.900	0.000	***
	seller_finance	0.602	13.590	0.000	***
player profile	age20-	0.229	6.680	0.000	***
	age21	0.131	4.510	0.000	***
	age22	0.085	3.240	0.001	***
	age23	0.038	1.530	0.126	
	age24	0.048	2.080	0.038	*
	age25	0.000	0.000	0.999	
	age26	0.000		ref	
	age27	-0.052	-2.310	0.021	*
	age28	-0.088	-3.500	0.000	***
	age29	-0.158	-6.360	0.000	***
	age30	-0.203	-7.490	0.000	***
	age31	-0.301	-10.470	0.000	***
	age32	-0.435	-12.200	0.000	***
	age33+	-0.429	-11.850	0.000	***
	pos_gk	-0.050	-1.420	0.157	
	pos_df	-0.112	-5.210	0.000	***
	pos_md	-0.037	-2.340	0.020	*
pos_fw	0.000		ref		

	variable	coef	t	p	
player performance	experience	0.207	13.100	0.000	***
	experience_u21	0.016	2.310	0.021	*
	min01	-0.132	-2.550	0.011	*
	min02	-0.156	-4.110	0.000	***
	min03	-0.086	-2.270	0.023	*
	min04	-0.058	-2.220	0.027	*
	min05	-0.038	-1.930	0.054	
	min06	0.000		ref	
	min07	0.061	3.170	0.002	**
	min08	0.106	5.440	0.000	***
min09	0.161	7.990	0.000	***	
min10	0.179	7.040	0.000	***	
goals_s14	0.007	8.880	0.000	***	
dribbles_s14	0.036	6.270	0.000	***	
defens_s12	0.059	2.950	0.003	**	
stat_inter	0.002	3.420	0.001	**	
stat_interactive	0.070	3.890	0.000	***	
inflation	s2011	0.000		ref	
	s2012	-0.074	-2.960	0.003	**
	s2013	-0.042	-1.580	0.114	
	s2014	-0.017	-0.670	0.500	
	s2015	0.093	3.750	0.000	***
	s2016	0.184	7.700	0.000	***
	s2017	0.262	10.860	0.000	***
	s2018	0.348	13.280	0.000	***
constant	_cons	3.689	60.760	0.000	***

Normality of residuals

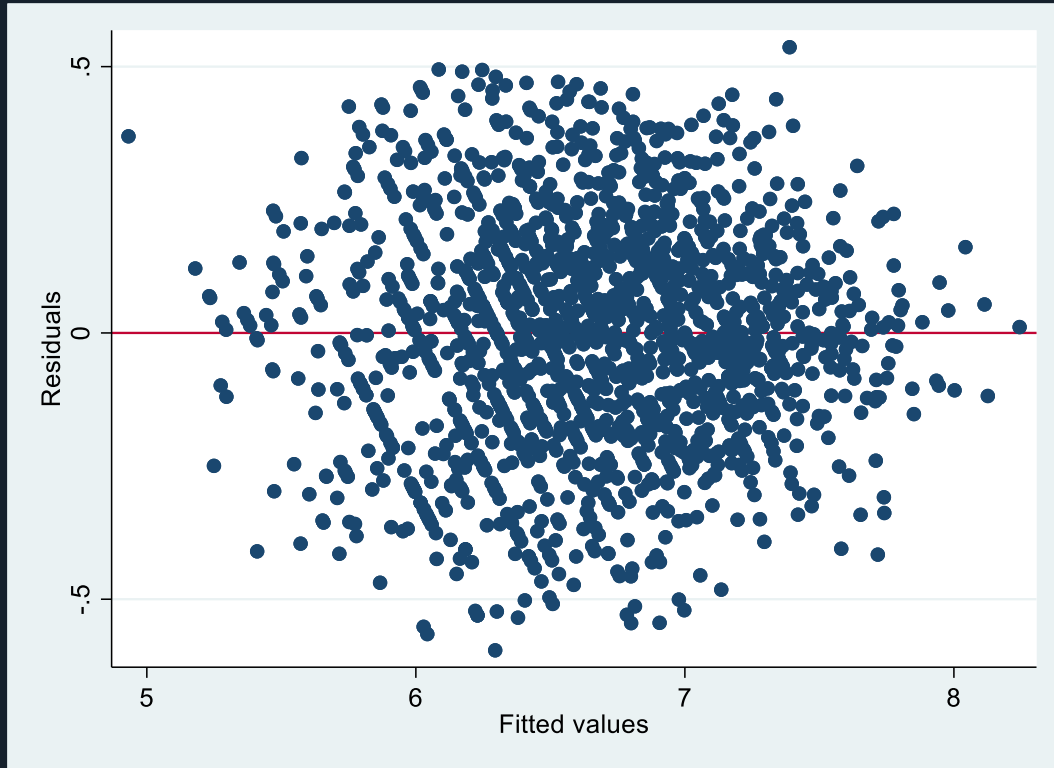


Standardized normal probability plot



Quantiles of predicted value against quantiles of normal distribution

Heteroscedasticity



Residual-versus-fitted plot

Source	chi2	df	p
Heteroskedasticity	964.21	956	0.4198
Skewness	49.09	47	0.3892
Kurtosis	18.77	1	0.0000
Total	1032.07	1004	0.2625

Cameron & Trivedi's decomposition of IM-test

Multicollinearity

Variance inflation factors (VIFs)
for the independent variables

Variable	VIF	1/VIF
pos_df	3.50	0.29
exptr_l	3.18	0.31
s2017	2.92	0.34
s2016	2.91	0.34
s2015	2.83	0.35
s2014	2.38	0.42
s2018	2.33	0.43
buts_14	2.28	0.44
s2012	2.27	0.44
drib_12l	2.25	0.44
age1	2.17	0.46
inter_df	2.13	0.47
cflast	2.13	0.47
s2013	2.12	0.47
min9	2.11	0.48
pos_md	2.08	0.48
prcofi2b_s0	2.00	0.50
min8	1.92	0.52
pos_gk	1.88	0.53
recofi2b_s0	1.80	0.56
age6	1.80	0.56
age8	1.79	0.56
age5	1.79	0.56
min10	1.71	0.58

Variable	VIF	1/VIF
min7	1.68	0.59
age4	1.68	0.60
min5	1.65	0.61
age10	1.64	0.61
age3	1.63	0.61
contr04	1.61	0.62
contr05	1.59	0.63
min1	1.59	0.63
age9	1.58	0.63
age11	1.55	0.64
age2	1.54	0.65
contr03	1.53	0.65
min2	1.50	0.67
age12	1.49	0.67
min4	1.47	0.68
prvc_valog0	1.42	0.70
interact1	1.42	0.71
yg_exp	1.36	0.73
age14	1.31	0.77
min3	1.30	0.77
age13	1.29	0.77
interpot	1.24	0.81
contr01	1.11	0.90
Mean VIF	1.88	

Cross-validation

cross-validation	training		test	
	r2	N	r2	N
cv1	85.4%	1320	87.7%	330
cv2	86.2%	1320	84.7%	330
cv3	86.2%	1320	84.6%	330
cv4	86.3%	1320	84.4%	330
cv5	86.3%	1320	84.8%	330

Training samples and coefficient

variable	training1	training2	training3	training4	training5
contr01	-0.314	-0.342	-0.334	-0.335	-0.349
contr03	0.155	0.151	0.157	0.137	0.156
contr04	0.196	0.170	0.171	0.172	0.180
contr05	0.240	0.228	0.253	0.247	0.229
book_value	0.045	0.050	0.053	0.043	0.043
age20	0.221	0.262	0.206	0.209	0.250
age21	0.137	0.150	0.101	0.128	0.141
age22	0.090	0.094	0.064	0.083	0.090
age23	0.035	0.057	0.003	0.031	0.057
age24	0.055	0.057	0.034	0.032	0.057
age25	0.013	0.013	-0.022	-0.010	0.006
age27	-0.059	-0.036	-0.079	-0.051	-0.038
age28	-0.105	-0.068	-0.097	-0.083	-0.083
age29	-0.157	-0.156	-0.163	-0.150	-0.169
age30	-0.191	-0.197	-0.222	-0.205	-0.197
age31	-0.305	-0.275	-0.328	-0.286	-0.310
age32	-0.440	-0.404	-0.472	-0.449	-0.415
age33	-0.439	-0.392	-0.453	-0.436	-0.423
pos_gk	-0.074	-0.059	-0.030	-0.043	-0.045
pos_df	-0.109	-0.118	-0.106	-0.117	-0.110
pos_md	-0.027	-0.041	-0.038	-0.044	-0.035
experience	0.208	0.215	0.192	0.215	0.204
experience_u21	0.017	0.015	0.018	0.017	0.014
min01	-0.145	-0.131	-0.139	-0.140	-0.106
min02	-0.164	-0.128	-0.191	-0.147	-0.150
min03	-0.096	-0.085	-0.086	-0.086	-0.074
min04	-0.060	-0.065	-0.071	-0.044	-0.051
min05	-0.047	-0.041	-0.032	-0.036	-0.033
min07	0.051	0.057	0.074	0.061	0.063
min08	0.098	0.087	0.116	0.107	0.120
min09	0.150	0.156	0.170	0.155	0.174
min10	0.172	0.189	0.181	0.167	0.188
goals_s14	0.007	0.006	0.007	0.006	0.007
dribbles_s14	0.034	0.034	0.039	0.037	0.037
defens_s12	0.063	0.058	0.069	0.041	0.064
stat_inter	0.002	0.002	0.002	0.001	0.002
stat_interactive	0.064	0.078	0.064	0.078	0.065
buyer_finance	0.898	0.923	0.875	0.915	0.917
seller_results	0.180	0.175	0.187	0.159	0.172
seller_finance	0.576	0.603	0.605	0.628	0.601
s2012	-0.097	-0.049	-0.078	-0.064	-0.080
s2013	-0.046	-0.037	-0.068	-0.028	-0.035
s2014	-0.019	0.000	-0.034	-0.010	-0.026
s2015	0.084	0.114	0.082	0.094	0.087
s2016	0.169	0.208	0.174	0.184	0.184
s2017	0.254	0.272	0.249	0.275	0.256
s2018	0.342	0.369	0.329	0.354	0.345
_cons	3.729	3.627	3.768	3.650	3.675

From analysis to prediction

Two main issues:

(1) Predicting inflation ?

(2) Predicting interest and the financial strength of buyer club ?

From analysis to evaluation

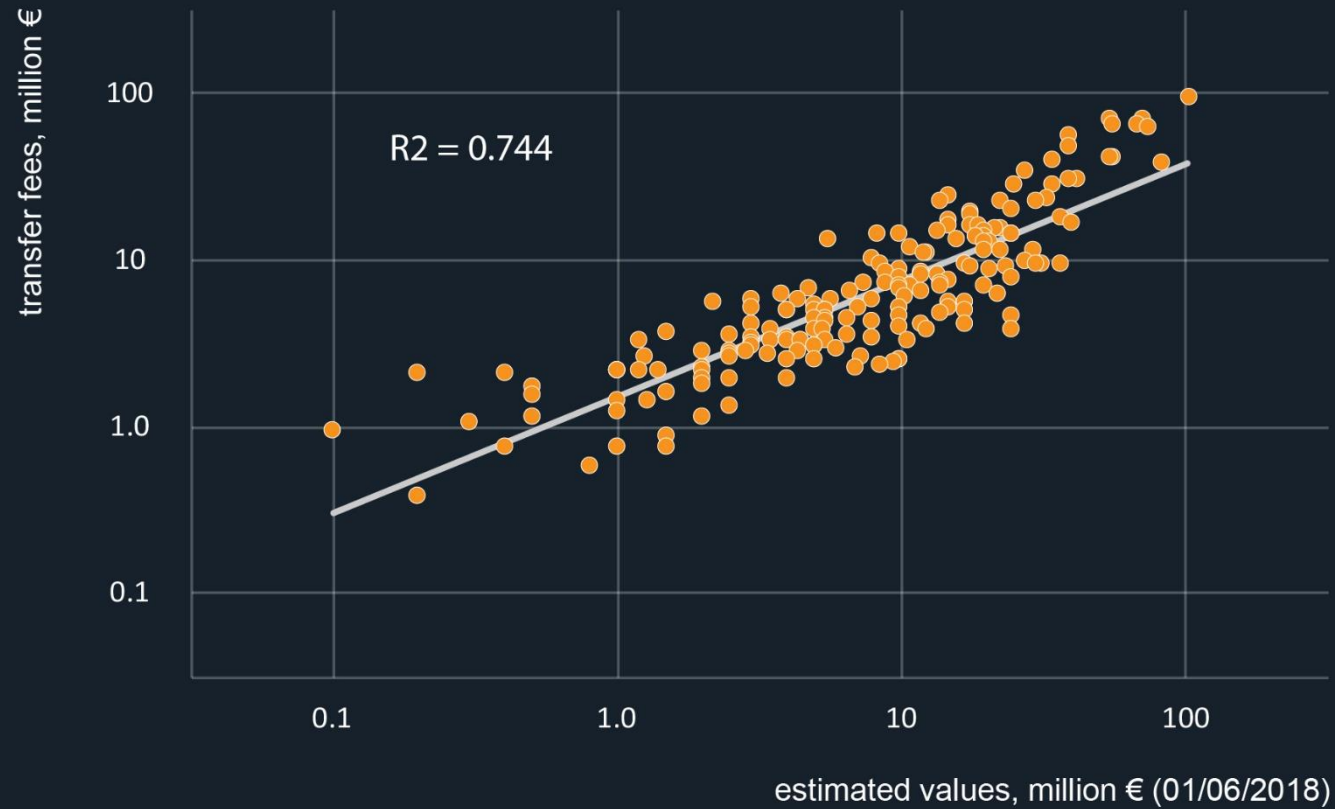
Transfer values, 12/06/2019 (million €)

Club - End of contract - Age - National A-team

1	KYLIAN MBAPPÉ PSG (FRA) - 2023 - 20.5 - FRA	252.0
2	MOHAMMED SALAH Liverpool (ENG) - 2023 - 27.0 - EGY	219.6
3	RAHEEM STERLING Manchester City (ENG) - 2023 - 24.5 - ENG	207.8
4	LIONEL MESSI FC Barcelona (ESP) - 2021 - 32.0 - ARG	167.4
5	JADON SANCHO Borussia Dortmund (GER) - 2022 - 19.2 - ENG	159.4
6	SADIO MANÉ Liverpool (ENG) - 2023 - 27.2 - SEN	157.8
7	HARRY KANE Tottenham (ENG) - 2024 - 25.9 - ENG	155.2
8	ROBERTO FIRMINO Liverpool (ENG) - 2023 - 27.7 - BRA	144.2
9	ANTOINE GRIEZMANN Atlético Madrid (ESP) - 2023 - 28.2 - FRA	143.8
10	LEROY SANÉ Manchester City (ENG) - 2021 - 23.4 - GER	137.1

CIES football Observatory
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From analysis to evaluation



Summer 2018 transfer windows

Transfer fees and estimated values (before the transfer window period)

Conclusions

Evaluation of the value of players: a very ambitious exercise given the complexity of the transfer market

A critical reflection on the quality of the data is probably more important than the sophistication of the statistical methods to obtain a powerful predictive power.

Despite everything, a transfer market still very rational

A quite convincing model, probably very difficult to improve

A strong need for player evaluations

Transfer negotiations

Contractual negotiations

Transfer litigation

Credit negotiations

Taking out insurance

Detection of suspicious cases

Transparency

Regulation of the transfer market

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